

Rennaker, Joanne (DEQ)

From: Benzie, Richard (DEQ)
Sent: Thursday, November 06, 2014 10:10 AM
To: Poy, Thomas; Crooks, Jennifer
Cc: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)
Subject: Flint

Tom and Jennifer,

I received a phone call from an unidentified individual who wanted to talk to someone responsible for clean drinking water in the city of Flint. I told him that Michigan has adopted the Safe Drinking Water Act and has primary enforcement responsibility for this program. I provided him with the names of the district supervisor and district engineer that oversee this system, but he didn't want their telephone numbers because he wasn't going to waste his time with them.

He really wanted to talk to someone in Washington. I told him the EPA Administrator was Gina McCarthy, but I did not have her number or any of the others at headquarters because we work with the Region 5 EPA office. He asked for contact information, so I provided him with Tom's telephone number. I'm letting you know so you will hopefully be prepared to deal with the fact that he doesn't want to discuss this matter with the state.

I just talked to him again, as he called the OEA saying the number I gave him (312-886-5991) was incorrect, but he may have had it wrong initially. I offered to give him Jennifer Crooks phone number, and he was adamant that he did not want to talk to her. I suspect he has called about this issue previously.

Good luck.

Richard

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, December 16, 2014 11:08 AM
To: Busch, Stephen (DEQ)
Subject: Flint
Attachments: TTHM Reduction measures.doc

Steve,

I spoke with WTP staff (Brent and Mike) and the WSC (Robert Binscik) to confirm the proactive measures taken by the city; thus far, towards reducing TTHM levels. Attached is a brief summary.

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

**TTHM Reduction
Action taken by City
December 16, 2014**

Flint's 3rd quarter of TTHM monitoring (Nov 20th, 2014) shows a reduction in TTHM levels at all of the sampling locations. The reduced TTHMs are the combined result of seasonal variation of total organic carbon (TTHM precursors) in the raw water and action taken by the city towards reducing TTHM levels. The amount of reduction contributed by each factor cannot be determined; however, the following is a list of proactive measures taken by the city in their effort to reduce TTHM levels.

1. Removed the 20 MGAL Dort Reservoir from service.

The reservoir allowed treated water from the WTP to re-circulate back to high service thus adding up to one week of retention time.

2. Softening 100% of the WTP flow during normal plant operation.

Softening the complete flow reduces the chlorine demand. During high water demands (large main breaks, filling reservoirs), split treatment must be utilized due to VFD control problems with the 20 MGD low service pump; however, split treatment is no longer the WTP's main mode of operation.

3. Improved turn-over of water in distribution system reservoirs.

The operating range of the Cedar Street and Westside reservoirs was increased from 1-2 ft. (summer) to approximately 10 feet. The increased drawdown has reduced residence time and improved chlorine residuals.

4. Established a more proactive flushing program.

Increased flushing reduced residence time in the distribution system especially at dead-ends.

5. Optimizing Transmission System Operation w. repair of major valves and confirming proper valve position.

Several critical valves were replaced on one of Flint's four major transmission mains and several other valves (found to be closed) were opened. This eliminated stagnation problems in areas near this main, improved chlorine residuals and allows the main to operate in a looped configuration.

Action to be taken soon:

- **LAN treatability study – jar testing (Starting this week)**
- **Trouble shoot Ozone system – early January**
- **Disinfect filters – after the next “top-off” of system reservoirs**

Rennaker, Joanne (DEQ)

From: Wurfel, Brad (DEQ)
Sent: Monday, March 16, 2015 4:44 PM
To: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Benzie, Richard (DEQ)
Subject: Flint

Hey, all. Harvey has a meeting with city residents Wednesday. Need that enforcement info ASAP, tomorrow at latest and sooner is better. Also, on the water filter issue, spoke with Wyant today and he much liked the idea of having a specific product recommendation come from one of the cities contractors.

Steve, can you please get contact information for the best contractor in Flint to address this?

Thank you!

Sent from my iPhone

Rennaker, Joanne (DEQ)

From: Cook, Pat (DEQ)
Sent: Thursday, May 29, 2014 12:46 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject: Flint

Have either of you talked to Lathan Jefferson recently? He left me a voicemail message with complaints about the Flint water system. Any updates would be appreciated.

Patrick Cook, P.E.
Community Drinking Water Unit
Office of Drinking Water & Municipal Assistance
Michigan Department of Environmental Quality
Phone: (517) 284-6514
cookp@michigan.gov

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Thursday, May 07, 2015 4:54 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Shekter Smith, Liane (DEQ); Benzie, Richard (DEQ); Philip, Kris (DEQ); Deltoral, Miguel; Poy, Thomas; Porter, Andrea
Subject: Flint

Steve and Mike—I mentioned this briefly to Liane last week at our State Directors' meeting when Liane was here in Chicago, and I want to keep you all in the loop as to what we're doing here: After Miguel and I went to Bay City to give presentations at the Local Health Dept workshop on Monday afternoon last week, we stopped at Ms. LeeAnne Walters' home in Flint Monday to take her sample bottles for a sampling study. We stayed several hours to check out the plastic plumbing in her home, the piping out of her house, what mains the other homes in the neighborhood were likely to be getting their water from, etc, and Miguel took many pictures. Miguel is working with Mark Edwards at Virginia Tech, a well-known national expert in the area of lead, and Mike Schock at EPA's Office of Research and Development in Cincinnati.

Miguel drove back to Flint yesterday to be present when the City replaced Ms. Walters' water service line. Miguel took a piece of the service line pipe for analysis and to study the scale on the inside of the pipe.

Miguel is putting together a summary of his findings, which he will complete next week. He will send his summary to you all for your review. I will be out of the office tomorrow, but back in the office next Monday – Thursday, in case you have questions; or you can contact Tom Poy tomorrow.

Jennifer

Jennifer Kurtz Crooks
Michigan Program Manager
Ground Water and Drinking Water Branch
U.S. EPA Region 5
77 West Jackson Blvd.
Chicago, Illinois 60604
312.886.0244
crooks.jennifer@epa.gov
312.582.5853 (fax)

Rennaker, Joanne (DEQ)

From: Brent Wright <bwright@cityofflint.com>
Sent: Friday, May 16, 2014 1:40 PM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Cc: Howard Croft; Daugherty Johnson; Michael Glasgow
Subject: Fluoride application at The Flint Water Treatment Plant

Gentleman per our earlier conversation Flint WTP would like to suspend the application of Fluoride in its treatment process until the first part of June, 2014. With this being our first month of operation and 2/3's of the operation staff in training, I feel the citizens of Flint would be better served if the operation staff were able to just concentrate on primary drinking water standards at this time. Please respond with any thoughts or concerns you may have regarding this matter.

Thank you

--

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: Krisztian, George (DEQ)
Sent: Monday, October 19, 2015 4:23 PM
To: Sygo, Jim (DEQ); Wurfel, Brad (DEQ); Pallone, Maggie (DEQ); Tommasulo, Karen (DEQ)
Cc: Wyant, Dan (DEQ); Shekter Smith, Liane (DEQ); Thelen, Mary Beth (DEQ); Shaler, Karen (DEQ); Prysby, Mike (DEQ); Busch, Stephen (DEQ); Cook, Pat (DEQ)
Subject: Follow up conversation with Howard Croft

I checked in with Howard from the City of Flint today to find out how the transition to Detroit water was going. He indicated that Flint switched over in a controlled manner so as to minimize disruptions in the infrastructure. He said that the transition went very smoothly and that Flint is on Detroit water 100%.

Howard also indicated that they would be doing testing throughout the distribution system and they would be focusing on hardness levels to determine the extent to which the Detroit water had made it through the system. He anticipated that it would be a full week before there was a complete turnover of the source water.

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: Shekter Smith, Liane (DEQ)
Sent: Tuesday, August 25, 2015 1:56 PM
To: lwalters313@gmail.com
Cc: Busch, Stephen (DEQ); Devereaux, Tracy Jo (DEQ)
Subject: Follow Up from our Aug. 4th meeting

Dear Ms. Walters,

I wanted to update you regarding our Department's findings related to questions raised during our meeting at the Governor's office on August 4. I apologize for the delay in getting back to you.

Lead and Copper Monitoring

Regarding Flint lead and copper compliance monitoring for the January – June 2015 period, the City has confirmed that all lead and copper samples collected throughout the City, whether routine sites or customer requests, were sent to the State of Michigan lab for analysis. Individual sample results are provided to the property owner within 30 days of receiving the lab results in accordance with the Michigan Safe Drinking Water Act (Public Act 399, 1976 Administrative Rule 410(5)). Results from the State of Michigan lab are provided directly to our Office.

Staff have confirmed that the lead 90th percentile compliance calculation of 11 parts per billion is based on 69 samples that met the appropriate sampling location site criteria, and met the sample collection site and collection protocol requirements of the Safe Drinking Water Act for this monitoring period. A minimum of 60 samples were required for this monitoring period. As indicated during the meeting, the City's sampling for lead complies with the Action Level standard of 15 parts per billion, but based on the population served by the City and these results, the City will need to make a recommendation to the MDEQ on how they will fully optimize their corrosion control treatment. These next steps continue to follow the requirements of the Lead and Copper Rule.

Samples collected at your residence of 212 Browning Avenue were not included this compliance determination as you utilize a whole home filter. As stated in the Michigan Safe Drinking Water Act (Public Act 399, 1976 Administrative Rule 710a, Lead and Copper in tap water; monitoring requirements) "Sampling sites may not include faucets that have point of use or point of entry treatment devices designed to remove inorganic contaminants." Such treatment alters the water chemistry and water quality such that it is no longer representative of public water from the City's distribution system. Therefore, the City cannot use samples collected at your residence as part of its determination for public water system compliance with the lead or copper action level standard.

Sample Summary (samples taken at your residence)

For your information, we are providing the information that we've gathered regarding samples collected at your home. Our records indicate between February and June of this year there were six samples collected by either you or Mr. Mike Glasgow with the City of Flint, and submitted to the State Laboratory for analysis as follows:

February 11, Bathroom tap, collected at 10:20 AM by Mike Glasgow. This sample was analyzed for aesthetic metals (copper, iron, manganese, and zinc) which does not include lead analysis.

February 18, Kitchen tap, collected at 7:15 AM by you. This sample was analyzed for lead (104 parts per billion) and copper (non-detect).

February 25, Kitchen tap, collected at 10:26 AM by Mike Glasgow. This sample was analyzed for metals including lead. All results (including lead) were non-detect except for Barium 0.01 parts per million. The result for Barium was well below its maximum contaminant level of 2 parts per million.

March 3, Kitchen tap, collected at 6:00 AM by you. This sample was analyzed for lead (397 parts per billion) and copper (non-detect).

March 18, Kitchen tap, collected at 11:10 AM by Mike Glasgow. This sample was analyzed for lead (4 parts per billion) and copper (non-detect).

April 2, Pre-point of service, collected at 8:00 AM by you. This sample was analyzed for lead (707 parts per billion) and copper (110 parts per billion).

Lead Education/Outreach

As we discussed during the meeting, we support efforts to educate homeowners about the sources of lead in their private residence, provide guidance measures to reduce the potential for lead exposure, and provide information on resources for lead abatement. Along those lines, our Office has been in contact with the Department of Health and Human Services, Environmental Health Division, Healthy Homes Section and had some preliminary discussions about a public education and assistance campaign regarding household lead issues, guidance and abatement.

Lead monitoring by public water systems serves a dual purpose. The first purpose is to ensure the public water supply is adequately treating its water to address corrosion potential and help limit lead exposure. The second purpose is to inform homeowners about lead levels within their individual residence so that they can make educated choices regarding their own exposure risk.

pH Results

During the meeting concerns were also expressed regarding pH levels within customer plumbing systems. As you may know, pH has no associated contaminant level as it is simply a numeric scale used to specify the acidity or alkalinity of a solution. The City of Flint conducts daily monitoring of pH values on both its raw and finished (treated) water at the City's water treatment plant as part of its operations. The City is also required to conduct water quality parameter monitoring in the distribution system, which includes pH. Samples are analyzed in accordance with Standard Methods using properly calibrated analytical equipment. Results for pH from these samples are summarized below.

Since late April 2014 – June 2015, the following pH conditions were reported:

Water Treatment Plant – Finished Water plant tap pH range = 7.07 minimum to 9.9 maximum, overall average 7.7, measured daily. We believe the 9.9 is a one- time anomaly from softening treatment.

Distribution System – Water Quality Parameters taken from 25 sample sites located throughout and monitored quarterly

July – Sept. 2014: pH 7.71 average, range 7.56 – 7.86

Oct. – Dec. 2014: pH 7.88 average, range 7.62 – 8.10

Jan. – March 2015: pH 7.81 average, range 7.60 – 7.99

April – June 2015: pH 7.63 Average, range 7.48 – 7.80

In addition, the City's treated water contains alkalinity, which is a measurement of the buffering capacity of water to resist a change in pH. As you can see from the water quality parameter monitoring results above there has been very little change in pH within the City's distribution system. The pH levels described within customer site piping or premise plumbing systems are believed to be the result of onsite treatment and not representative of water quality shown to be occurring in the public water supply system.

Consumer Confidence Report

Finally, there was confusion during the meeting regarding the City's annual water quality report, the Consumer Confidence Report which we have since been able to clarify.

The City of Flint issued two separate Consumer Confidence Reports (CCR's) in 2015 covering the water quality data from 2014. One report was for the period of January – April 2014 when the City was obtaining water from Detroit (DWSD). And a second report was for the period April – December 2014 when the City was using the Flint River and its own Water Treatment Plant.

The CCR for DWSD water was mailed to customers in June. The Flint River based CCR was mailed to customers in mid-July, delayed due to issues with the printing contractor. We agree that having two separate reports caused confusion. We are working with the City to ensure both reports are posted to the City's website and both are made available when requested by customers. Should the City choose to create separate CCR's during the year that the City of Flint connects to the Karegnondi Water Authority we will work with the City to provide more clarity and try to have all material included in a single mailing.

The DWSD based CCR is the one community members had at the meeting, while the DEQ brought a copy of the Flint River based CCR. As separate and distinct sampling was done under each source, this explains the discrepancy in the values and monitoring periods being reported in the respective CCR's.

We appreciate your interest in these matters and hope this has addressed many of the questions brought up during our meeting. I would like to provide this information to both Dr. Sullivan and Ms. Mayes, but I do not have their contact information. I'm hoping you can share this with them and any others that may be interested.

Sincerely,

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

Rennaker, Joanne (DEQ)

From: Rennaker, Joanne (DEQ)
Sent: Wednesday, January 14, 2015 10:35 AM
To: Howes, Sarah (DEQ)
Cc: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)
Subject: Formal correspondence sent to City of Flint in 2014
Attachments: Formal correspondence with City of Flint - 2014.pdf

Dear Ms. Howes,

Per your request to Steve Busch, I have attached scanned copies of the formal correspondence (correspondence sent on letterhead) sent to the City of Flint in 2014.

Please let us know if you require anything else.

Jo Anne Rennaker
Secretary
Department of Environmental Quality - Lansing District Office
Office of Drinking Water & Municipal Assistance
Office of Waste Management & Radiological Protection
517-284-6643



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE



DAN WYANT
DIRECTOR

December 16, 2014

Mr. Brent Wright, Operation Supervisor
City Of Flint - DPW
Flint Water Plant
4500 North Dort Highway
Flint, MI 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Violation Notice – Maximum Contaminant Level for Total Trihalomethanes
Operational Evaluation – Total Trihalomethanes
4th Quarter 2014 Monitoring Period

The Department of Environmental Quality (DEQ), Office of Drinking Water and Municipal Assistance (ODWMA), records show that the City of Flint is in violation of the Safe Drinking Water Act, 1976 PA 399, as amended (Act 399); R 325.10610, *Maximum contaminant levels (MCL) for disinfection byproducts*, of the 1979 Administrative Code.

In accordance with R.325.10610, *MCLs for disinfection byproducts*, of the 1979 Administrative Code, the MCL for disinfection byproduct total trihalomethanes (TTHM) is 0.080 milligrams per liter (mg/L) as a Locational Running Annual Average (LRAA) at each monitoring location. As listed in the table below, our records show that the City of Flint's highest TTHM locational running annual average (LRAA), based on the last three quarters, ending November 30, 2014, is 0.099 mg/l which exceeds the standard, and that two of the eight sample site locations exceed the standard of 0.080 mg/L.

Further, in accordance with R325.10719I, *Disinfection byproducts: operational evaluation levels*, of the 1979 Administrative Code, when an operational evaluation level (OEL) at a monitoring location for TTHM exceeds 0.080 mg/L, a supply shall conduct an operational evaluation and submit a written report of the evaluation to the department not later than 90 days after being notified of the analytical result that causes the supply to exceed the operational evaluation level. As listed in the table below, our records show that TTHM operational evaluation levels for the City of Flint exceed 0.080 mg/L at four of the City's eight sample site locations.

TTHM Results (mg/L)					
	5/21/14	8/21/14	11/20/14	LRAA	OEL
DBP1 McDonalds 3719 Davison	0.162	0.145	0.059	0.092	0.106
DBP2 Liquor Palace 3302 S. Dort Highway	0.112	0.127	0.033	0.068	0.076
DBP3 North Flint Auto 6204 N. Saginaw St.	0.097	0.118	0.041	0.064	0.074
DBP4 University Market 2501 Flushing Road	0.106	0.196	0.094	0.099	0.122
DBP5 Taco Bell 3606 Corunna Road	0.079	0.181	0.034	0.074	0.082
DBP6 Rite-Aid Pharmacy 5018 Clio Road	0.088	0.144	0.054	0.072	0.085
DBP7 Salem Housing 3216 MLK Boulevard	0.082	0.112	0.050	0.061	0.074
DBP8 BP Gas Station 822 S. Dort Highway	0.075	0.112	0.036	0.056	0.065

Our investigation consisted of a review of ODWMA files for laboratory reports received for compliance monitoring. Our investigation is considered complete. This violation began on December 1, 2014, and will continue until TTHM LRAA is below the MCL at all sample sites.

We acknowledge and appreciate the city's cooperation with our recommendation to preemptively conduct an Operational Evaluation following the City's second quarterly round of monitoring in August. That Operational Evaluation report has identified possible causes and corrective measures for the elevated TTHM levels which we encourage the City continue implementing. These modifications have likely contributed in part to the reduction in TTHM levels reported in the most recent quarter, and suggest the City may be able to achieve compliance with the TTHM standard.

Our office is continuing to review the Operational Evaluation report that was submitted on December 1, 2014, and will provide the City and their consultant comments as needed to help address this MCL violation.

Water systems that exceed the OEL must complete and submit an Operational Evaluation in accordance with Administrative Rule 719I (R325.10719I) within 90 days of being notified of the violation. **An updated Operational Evaluation report, which incorporates the most recent sample results, must now be completed and received by our office by no later than March 1, 2015.**

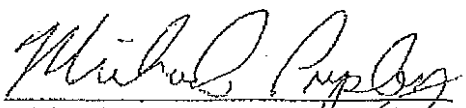
If you have any other factual information you would like us to consider regarding the violation identified in this Violation Notice (VN), please provide them in a written response by January 16, 2015.

Administrative rule R 325.10403 of Act 399 requires that suppliers provide public notice (PN) as soon as practical, but no later than thirty (30) days after the supplier learns of this type of violation, by mail or direct delivery and by any other means reasonably calculated to reach customers not normally reached by mail. Enclosed is a sample PN

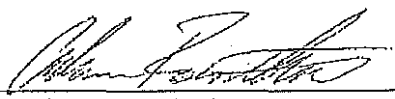
which contains the minimum required language. The City is encouraged to include additional information regarding its response to this violation. Please notify your consumers by January 10, 2015, and send us a signed and dated copy of the notice that you issued within ten (10) days of distributing the public notice. This violation must also be included in your 2014 Consumer Confidence Report (CCR), due by July 1, 2015. The PN must be repeated every quarter until you no longer exceed the TTHM standard. Failure to issue a PN for this violation will result in a fine of at least \$1,000 per event, with a maximum of \$5,000 per violation.

We anticipate and appreciate your continued cooperation in resolving this matter. If you have any questions regarding this VN, please contact us at the numbers below.

Sincerely,



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



Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water & Municipal
Assistance
517-284-6644

mfp/ar/jlr
Enclosure

cc: Mr. Darnell Early, Emergency Manager, City of Flint
Mr. Daughtry Johnson, City of Flint
Mr. Howard Croft, City of Flint
Mr. Robert Binsik, City of Flint
Ms. Jennifer Crooks, U.S. Environmental Protection Agency, Region 5.
Genesee County Health Department
Ms. Liane Shekter Smith, P.E., DEQ
Mr. Richard Benzie, P.E., DEQ
Mr. Stephen Busch, P.E., DEQ

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

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 are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (May 21, August 21, and November 20 of 2014). The average of the results at ANY of the eight locations must not exceed the maximum contaminant level (MCL) for TTHMs, otherwise our water system exceeds the Maximum Contaminant Level (MCL). The standard for TTHMs is 80 µg/L. The location reporting the highest TTHM level was 99 µg/L; thus, our water system exceeds the TTHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- 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.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

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.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem by 2015.

For more information, please contact Mr. Brent Wright at 517-787-6537 or the Flint Water Plant at 4500 North Dort Highway, Flint, MI 48505.

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 the City of Flint.

CERTIFICATION:

WSSN: 02310

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

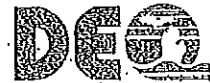
Date Distributed

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



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE



DAN WYANT
DIRECTOR

October 7, 2014

Mr. Brent Wright, Water Plant Supervisor
City Of Flint -- Department of Public Works
Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

WSSN: 02310
City Of Flint

Dear Mr. Wright:

SUBJECT: Violation Notice (VN) -- Maximum Contaminant Level (MCL) for Total Coliform

The Department of Environmental Quality (DEQ), Office of Drinking Water and Municipal Assistance (ODWMA), records show that the City of Flint is in violation of the Safe Drinking Water Act 1976 PA 399, as amended (Act 399); R 325.10602 *MCLs for total coliform bacteria*; of the 1979 Administrative Code.

In accordance with R 325.10602 *MCLs for total coliform bacteria*, a water supply that collects 40 or more samples per month is in compliance with the MCL for total coliforms if not more than 5% of the samples collected during a month are total coliform-positive. Our records show that 15 of 150 or 10% of the samples collected were total coliform-positive during the month of September 2014, which is a violation of the MCL. Our investigation consisted of a review of ODWMA files for laboratory reports received for compliance monitoring. The ODWMA guided you in the response of the total coliform-positive samples and repeat sampling protocol.

Our investigation is considered complete. This violation began on September 5, 2014, and continued until you returned to compliance.

To return to compliance, you collected repeat samples on September 8, 2014, that did not detect coliform bacteria. Although the specific cause of contamination has not been conclusively identified, it appears the situation has been corrected.

This MCL violation requires a Tier 2 public notice. Administrative rule R 325.10403 requires that suppliers provide public notice not later than 30 days after learning of the violation by mail or direct delivery and by any other means reasonably calculated to reach other persons regularly served by the system. Enclosed is a sample public notice. Please notify your consumers by November 2, 2014, and send us a signed and dated copy of the notice that was issued within 10 days of distributing the public notice. This violation must also be included in your Consumer Confidence Report, due by July 1, 2015.

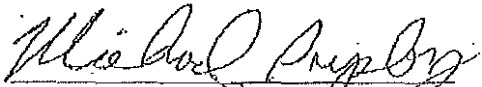
Failure to issue a public notice for this violation may result in a fine of at least \$1000 per day of the violation up to a maximum of \$5000. Additional violations are subject to fines of increasing

amounts. If you would like more information on the ODWMA policy on administrative fines policy, contact us at the numbers below.

If you have any factual information you would like us to consider regarding the violation identified in this VN please provide it in a written response by October 20, 2014.

We anticipate and appreciate your cooperation in resolving this matter. If you have any questions regarding this VN, please contact us at the numbers below.

Sincerely,



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



Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water & Municipal
Assistance
517-284-6644

mfp/ar/jlr
Enclosures

cc: Mr. Darnell Early, City of Flint
Mr. Daugherty Johnson, City of Flint
Mr. Howard Kroft, City of Flint
Mr. Robert Bincsik, City of Flint
Mr. Richard Benzie, P.E., DEQ
Genesee County Health Department

Important Information About Your Drinking Water

Tests showed coliform bacteria in the City of Flint water

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 to correct the situation.

We routinely monitor for drinking water contaminants. We took 150 samples to test for the presence of coliform bacteria during September 2014. 15 of those samples (10%) showed the presence of coliform bacteria. The standard is that no more than 5 percent of our samples may do so.

What should I do?

You do not need to boil your water or take other corrective actions. However, if you have specific health concerns, consult your doctor. People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their healthcare providers. 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.

What does this mean?

This is not an emergency. A portion of the City was notified to boil their water at the time of the incident until it was resolved. 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. Coliforms were found in more samples than were allowed and this was a warning of potential problems.

Usually, coliforms are a sign that there could be a problem with the system's 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, and further testing shows that this problem has been resolved.

What happened? What was done? On September 5, 2014, after routine and repeat samples showed the presence of total coliform, a boil water order was issued to the affected area. That area was flushed and resampled until samples were non-detect for total coliform. The boil order was lifted on September 9, 2014. Samples collected since then show that all results met acceptable limits.

For more information, please contact Mr. Brent Wright, Water Plant Supervisor, City Of Flint - DPW at 810.787.6537 ext. 3510 or Flint Water Plant - 4500 North Dort Highway, Flint, MI 48505.

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 the City of Flint.

CERTIFICATION:

WSSN: 02310

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 DNRE.



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE



DAN WYANT
DIRECTOR

September 10, 2014

Mr. Brent Wright
City of Flint Water Treatment Plant
4500 North Dort Highway
Flint, Michigan 48505

SUBJECT: Compliance Communication
Total Trihalomethane Operational Evaluation Requested

Under the Stage 2 Disinfectants and Disinfection Byproduct Rule, the City of Flint has been required to collect samples for the analysis of Total Trihalomethane (TTHM) and Haloacetic Acids (HAA5) at eight sites within the City's water distribution system. The City has completed two quarterly monitoring periods since changing its source water to the Flint River effective April 25, 2014.

Normally an Operational Evaluation Level (OEL) would be calculated in accordance with the Michigan Safe Drinking Water Act, Public Act 399, 1976, as amended, Administrative Rule 7196 (R 325.107196), each quarter once three quarters of results have been obtained and compared with the respective maximum contaminant level (MCL) for TTHM. Normally the calculation would be made as follows:

$$(2 \times \text{current quarter} + \text{sum of 2 previous quarters}) \text{ divided by } 4$$

As the City of Flint currently has only two quarters of data, the calculation has been modified as follows:

$$(2 \times \text{current quarter} + \text{previous quarter}) \text{ divided by } 4$$

The resulting OEL for each site is listed in the table below. All results are in parts per billion (ppb):

	5/21/14	TTHM 8/21/14	Mod. OEL		5/21/14	HAA5 8/21/14	Mod. OEL
DBP1 McDonalds 3719 Davison	162.4	145.3	113		64	43	38
DBP2 Liquor Palace 822 S. Dort Highway	111.6	112	84		52	40	33
DBP3 North Flint Auto 3302 S. Dort Highway	96.5	127.2	88		48	31	28
DBP4 University Market 3606 Corunna	106.4	181.3	117		55	24	26
DBP5 B&P Gas Station 2501 Flushing	75.1	196.2	117		38	17	18
DBP6 Salem Housing 3216 MLK Boulevard	82.2	112.4	77		41	25	23
DBP7 Kroger 5018 Clio Road	88.2	144.4	94		49	30	27
DBP8 Taco Bell 6204 N. Saginaw	79.2	118.3	79		50	37	31

Mr. Brent Wright

2

September 10, 2014

As shown in the table above, even with this less restrictive modified method, six of the City's eight sites already exceed the OEL limit of 80 ppb for TTHM. In addition, the City's two other sites are both more than 95% of the TTHM OEL limit.

The MCL for TTHM and HAA5 is based on a locational running annual average for each site, essentially the average at each site over the four previous quarterly monitoring periods. However, with TTHM levels of this magnitude, it is likely the MCL will be exceeded for at least one of these eight sites from just three quarters of monitoring results. For TTHM, four quarters at the MCL of 80 ppb (4×80) would provide 320 ppb allowable. As an example, site DBP1 through just two quarterly monitoring periods has a total of 307 ppb ($162+145$), leaving only 13 ppb over two more quarterly monitoring periods to maintain compliance with the MCL.

Therefore, this office is requesting the City of Flint complete an Operational Evaluation in accordance with Administrative Rule 719I (R325.10179I). The Operational Evaluation Report shall be submitted to this office no later than November 28, 2014. The report shall not be limited in scope and shall include the following:

Examination of Treatment Operational Practices

- Changes in source water quality
- Treatment changes
- Storage tank operations
- Excess storage capacity
- Treatment problems that contribute to TTHM formation

Examination of Distribution Operational Practices

- Storage tank operations
- Excess storage capacity
- Distribution system flushing

The report shall also include steps the City could consider to minimize future exceedances.

Additional guidance on completing the Operational Evaluation Report, including a number of forms that can be used to gather and evaluate water system information is provided in the United States Environmental Protection Agency's (U.S. EPA) Operational Evaluation Guidance Manual. This document is available on the U.S. EPA's website at the following link:

http://www.epa.gov/ogwdw/disinfection/stage2/pdfs/draft_guide_stage2_operationalevaluation.pdf

Be advised, failure to submit an Operational Evaluation Report by this deadline is a reporting violation subject to Tier 3 Public Notification.

The OEL is an indicator of operational performance. The water system must take proactive steps to be able to comply with the MCL's for TTHM and HAA5. While it is recognized that removal of Total Organic Carbon disinfection byproduct precursors as part of the treatment process has performed above minimum removal requirements under the treatment technique, around 4 parts per million of organic carbon are still present in the treated water and may be leading to additional TTHM formation in the City's distribution system.

While health effects associated with disinfection byproducts contaminants are based on chronic exposure, the City has available alternatives that must be considered to achieve compliance with this drinking water public health standard.

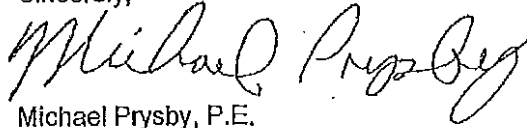
Mr. Brent Wright

3

September 10, 2014

If you have any questions regarding this information, please contact me at the number below.

Sincerely,



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

cc: Mr. Darnell Early, City of Flint
Mr. Daugherty Johnson III, City of Flint
Mr. Howard Croft, City of Flint
Mr. Robert Bincsik, City of Flint
Ms. Liane Shekter Smith, P.E., DEQ
Mr. Richard Benzie, P.E., DEQ
Mr. Stephen Busch, P.E., DEQ
Genesee Co. Health Dept.



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



DAN WYANT
DIRECTOR

TO: Water Supply Superintendent or Operator-In-Charge
FROM: Office of Drinking Water and Municipal Assistance, Lansing District Office
DATE: June 12, 2014
SUBJECT: 2013 Consumer Confidence Report Reminder

Your annual Consumer Confidence Report (CCR) is due to be delivered by July 1st.

You may use any combination of mail, door-to-door, or electronic methods to deliver to bill paying customers. This means you may mail and/or e-mail a message that the CCR is available on the internet or attached to the e-mail. If using the internet, the CCR must be on the internet when customers receive the message and the internet address displayed in the message must lead directly to the entire CCR. The message should tell customers how to request a paper copy. If you normally publish a non-English language CCR, then the notification of CCR availability should also be in that language.

Refer to last year's report and your most recent sample results when preparing this year's report. For more information on preparing your CCR, visit <http://michigan.gov/deq>. Click on Water, Drinking Water, Community Water Supply, and Consumer Confidence Report Rule.

In addition to delivering your CCR to your consumers by July 1st, remember to send a copy to us and to your local health department. Also send us documentation certifying how you delivered the CCR. Certification of delivery is due to us by October 1st, but we encourage you to send it to us when you deliver the CCR by July 1st. You can download the *CCR Certificate of Distribution Form* from the Web page noted above.

Did the United States Environmental Protection Agency (U.S. EPA) direct you to monitor for unregulated contaminants during 2013? Report the average and range of each contaminant detected. Also, provide an explanation of this required monitoring, such as, "Unregulated contaminants are those for which the U.S. EPA has not established drinking water standards. Monitoring helps the U.S. EPA to determine where certain contaminants occur and whether it needs to regulate those contaminants. We monitored for these contaminants and results of monitoring are available on request."

Please contact us with your questions. We would like to be available to answer all your questions as you draft your CCR, but we have found that our office is inundated with questions as the deadline nears. You might be best served if you contact us early.

Failure to deliver the CCR by July 1st is a reporting violation and will result in an administrative fine. Contact our office for more information.

This document was sent to the following facilities:

WSSN	NAME	WSSN	NAME
	Village of Almont	5395	Green Brook Estates
	Village of Bancroft	5550	City of Potterville
716	Bingham Township	6420	Village of Stockbridge
731	Bishop Lake Apartments	6505	City of Swartz Creek
795	Blue Water Village	6575	Sugar Tree Apartments
820	Village of Breckenridge	6790	Village of Vermontville
860	City of Brighton	6792	VFW National Home
1002	Oak Pointe	6820	W.J. Maxey Boys School
1010	City of Burton	6970	Village of Webberville
1340	City of Charlotte	6971	Wedgewood Golfside
1353	Chateau Du Lac Condos	7015	West Court Ranches
1490	City of Clio	7050	Village of Westphalia
1543	Centennial Farms	7101	Whitmore Lake Apartments
1565	Columbia Lakes Estates	7185	Woodruff Lake Co-Op
1570	Village of Columbiaville	7285	Eagle Pointe Condos
1663	Cranes Cove Condos	40116	Dutch Hills
1718	Village of Danville	40119	Meadows of St. Johns
1720	City of Davison	40122	Hi-Way Mobile Haven
1870	Village of Dryden	40123	Maple Knoll
1900	City of Durand	40131	Tradewinds MHP
1995	ELMWSA	40138	Gunther MHC
2025	Eaton Green Estates	40140	Hi-Way MHC
2120	Village of Elsie	40145	Linden Place MHP
2270	City of Fenton	40151	Loon Lake MHP
2274	Fenton Heights Apartments	40152	Montrose Trailer Park
2277	Lakepark Village Condos	40154	North Dort Manor
2310	City of Flint	40155	North Morris Estates
2347	Fonda Lake Water Authority	40156	Old Orchard Estates
2390	Village of Fowler	40158	Lake Fenton Mobile Home Park
2400	Village of Fowlerville	40162	Westhaven Mobile Court
2615	Genesee County Water System	40164	Swartz Creek Meadows
2617	Genesee Township	40193	Country Manor MHP
2619	Prentiss Estates Apartments	40194	Hamlin MHP
	Glen Devon Condos	40197	Mason Manor
	City of Grand Blanc	40199	Stonegate MHC
2770	City of Grand Ledge	40200	Sunset MHP
2785	Grand Pointe Subdivision	40202	Willow Village
2855	Greenwood Apartments	40203	Windmill Park
3073	Hartland Hills Condos	40204	Winslow's Mobile Home Terrace
3080	Harvest Hills Subdivision	40299	Idean Villa MHP
3134	Highfields Youth Camp	40450	Countryside Village
3137	Hidden Lakes - Green Oaks	40452	Moon Lake Estates
3760	Lansing Board of Water & Light	40453	Northwood MHE
3770	Lansing Township	40454	Pleasant Valley TP
3780	City of Lapeer	40455	Woods & Fields - West
3840	City of Leslie	40456	Quiet Cove TP
3857	Prestige Pines	40457	Country Manor
3890	City of Linden	40458	Alan's Park - Durand
3942	Island Lake Apartments	40574	Timor Country MHP
4098	MHOG	40592	Sandhill Estates
4170	City of Mason	40599	Cadgewith Farms
4312	Village of Metamora	40601	Pine Ridge MHC
4340	Michigan State University	40607	East Bay MHP
4403	Millpoint of Hartland	40637	Nesen's Countryside Estates
4480	City of Montrose	40639	Woods & Fields - East
4520	City of Mount Morris	40643	Morrice Meadows
4595	Mystic Ridge	40644	Deerfield Pines MHP
4700	Village of New Lothrop	40647	Orchard Cove
4990	City of Olivet	40670	Pine Lakes MHC
5050	Village of Otisville	40672	River Ridge
5100	Village of Ovid	40675	Capitol Crossings
5280	City of Perry	63477	Dimondale Health Center
5315	Pheasant Run Manor		



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



DAN WYANT
DIRECTOR

TO: Water Supply Superintendent or Operator In Charge
DATE: August 21, 2014
SUBJECT: 2014 Drinking Water System Monitoring -- Reminder

This is just a friendly reminder that drinking water monitoring is due by September 30, 2014. This is not a notice of violation. This allows you the opportunity to verify that your submitted sample results match what we have received.

According to our records, not all drinking water monitoring has been performed as outlined in the 2014 Monitoring Schedule sent to you earlier this year. Please refer to the enclosed monitoring schedule to see which laboratory results we have not yet received. If you have results for monitoring listed in the schedule, please provide a copy to this office.

If monitoring has not yet been completed, please collect the required sample(s) no later than **September 30, 2014**, unless otherwise noted, to avoid monitoring violations, public notice requirements, and possibly administrative fines of at least \$200. If you use a private laboratory to analyze your samples, you must provide this office with copies of the results by October 10, 2014.

To receive credit for monitoring, you must include the "WSSN" (water supply serial number) and the "Site Code" when you submit samples for analysis.
These codes are listed on your monitoring schedule.

Reminder if Lead and Copper Monitoring Due This Year: The Lead and Copper Rule requires you to provide individual lead tap results, within 30 days of learning of results, to people who receive water from sites that were sampled, even if lead was not detected. You must also send us certification that you met all the delivery requirements along with a sample copy of your customer notice within 3 months after the end of the monitoring period. To download the *Lead and Copper Report and Consumer Notice of Lead Result Certificate* in Microsoft Word or PDF format, visit <http://michigan.gov/DEQ>. Click on Water, Drinking Water, Community Water Supply, and Reporting Forms.

If you have any questions or believe that the enclosed monitoring schedule is not accurate, please contact me at the number below.

Sincerely,

Adam Rosenthal
Environmental Quality Analyst
Field Operations Section
Office of Drinking Water and
Municipal Assistance
517-284-6644
rosenthala@michigan.gov

Enclosure

Attached letter and Drinking Water System Monitoring Schedule was sent to all facilities listed

b w

Arbor View Apartments	Alan's Park - Durand	Alma, City of
Argentine Care Center	Bellevue, Village of	Ashley, Village of
Beecher Metropolitan District	Bryon, Village of	Bingham Township
Burton, City of	Charlotte, City of	Bishop Lake Apartments
Chateaux Du Lac Condominiums	Columbia Lakes Estates	Breckenridge, Village of
Clifford, Village of	Corunna, City of	Brighton, City of
Clio, City of	Country Manor	Cadgewlth Farms
Cranes Cove Condominiums	Country Manor Mobile Home Park	Capitol Crossings
Crystal Creek Apartments	Countryside Village	Centennial Farms
Davison, City of	Dansville, Village of	Eastern MI Nazarene
Deerfield Pines Mobile Home Park	Delta Charter Township	Elsie, Village of
Dryden, Village of	Durand, City of	Fenton Heights Apartments
Fenton Harbor Condominiums	Eagle Pointe Condominiums	Fonda Lake Water Authority
Fenton, City of	ELMWA	Fowlerville, Village of
Flint, City of	Eaton Rapids, City of	Green Brook Estates
Genesee County Water System	Grand Ledge, City of	Greenfield Pointe Subdivision
Genesee Township	Grand Pointe Subdivision	Hartland Hills Condominiums
Glen Devon Condominiums	Greenwood Apartments	Hartland Township
Gr 'l Blanc, City of	Hamlin Mobile Home Park	Harvest Hills Subdivision
Gunner Mobile Home Court	Highfields Youth Camp	Hidden Lakes of Green Oaks
Ideal Villa Mobile Home Park	Hi-Way Mobile Haven	Hidden Shores West
Imlay City, City of	Lakeview Estates	Howell, City of
Lake Fenton Mobile Home Park	Lansing Board of Water & Light	Huntmore Estates
Lake Park Condominiums	Lansing Township	Island Lake Apartments
Lake Ponemah	Leslie, City of	Ithaca, City of
Lapeer, City of	Looking Glass Terraces	Lakeshore Village
Linden, City of	Maple Knoll	Laurels of Fulton
Metamora, Village of	Mason Manor	Livingston Comm. Water Auth.
Montrose Trailer Park	Mason, City of	Meadows of St. Johns
Montrose, City of	Michigan State University	MHOG
Mount Morris, City of	Misty Cove Senior Apartments	Mystic Ridge
North Dort Manor	Moon Lake Estates	Oak Pointe
North Morris Estates	New Lothrop, Village of	Osborn Lake Estates
Old Orchard Estates	Northwood Estates MHP	Ovid, Village of
Pheasant Run Manor Apartments	Olivet, City of	Peninsula Development
Pine Lakes Manufactured Homes	Orchard Place Manor	Perrinton, Village of
Pine Ridge Mobile Home Community	Owosso, City of	Pinckney, Village of
Pinehurst Apartments	Perry, City of	Pine Knoll Apartments
River Ridge	Pleasant Valley Trailer Park	Prentis Estates Apartments
Sa 'ill Estates	Pottersville, City of	Prestige Pines
Sugar Tree Apartments	Quiet Cove Trailer Park	Red Cedars Crossing
Swartz Creek Meadows	Stockbridge, Village of	St. Louis, City of

Swartz Creek, City of	Stonegate	Stone Ridge
T winds Mobile Home Park	Stoney Creek Village Apartments	Timber Country MHP
West Court Ranches	Sunfield, Village of	Westphalia, Village of
Western Pines Apartments	Sunset Mobile Home Park	Whitmore Lake Apartments
Westhaven Mobile Court	Vermontville, Village of	Woodland Center Correctional
	VFW National Home	Woodruff Lake
	Webberville, Village of	
	Williamston, City of	
	Willow Village	
	Windmill Park	
	Winslow's Mobile Home Terrace	
	Woods and Fields East	



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE



DAN WYANT
DIRECTOR

May 20, 2014

Mr. Brent Wright, Water Plant Superintendent
City of Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

WSSN: 02310

Dear Mr. Wright

Subject: Water Treatment Plant (WTP) Fluoridation

This letter, per your request, is being written to confirm the Department of Environmental Quality's (DEQ) position concerning the suspension of the application of fluoride until June 2014. Fluoridation was instituted in Flint approximately 50 years ago in order to increase the level of dental health protection.

While the DEQ supports fluoridation as the primary means to provide optimal dental health protection, we concur with the temporary interruption in fluoridation. This will allow WTP operators to focus on meeting the regulated drinking water standards and to increase proficiency in full-time WTP operation. The public health benefit of fluoridation is gained with long-term use and is not immediately compromised by a short-term interruption in application.

The focus on WTP operation is essential in meeting the regulated drinking water standards; thus, the city may suspend fluoridation until June 1, 2014. Please contact our office if fluoridation cannot resume by this date.

If you have any questions, feel free to contact me at (517) 290-8817; prysbym@michigan.gov; or Department of Environmental Quality, Office of Drinking Water and Municipal Assistance, Lansing District Office, 525 West Allegan Street, 1st Floor South, P.O. Box 30242, Lansing, Michigan 48909-7742.

Sincerely,

Michael F. Prysby, P.E.
District Engineer
Field Operations Section
Office of Drinking Water and
Municipal Assistance

mfp/jlr

cc: Mr. Howard Kroft, Utilities Director, City of Flint



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE



DAN WYANT
DIRECTOR

April 29, 2014

Mr. Daugherty Johnson, Utilities Administrator
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502

WSSN: 02310

Dear Mr. Johnson

Subject: Act 399 Capacity and Reliability Requirements

This letter, per your request, is being written as verification that the City of Flint water system is currently in compliance with required capacity and power service reliability requirements under the Michigan Safe Drinking Water Act and Administrative Rules, Supplying Water to the Public.

The required capacity of a waterworks system as established in Rule 1204 (R 325.11204) required sufficient capacity to meet approved finished water supply requirements, and is based upon the combination of the following options:

- a. Rated capacity of an approved surface water supply or complete treatment system;
- b. Firm capacity of approved groundwater supply;
- c. Available contracted capacity that can be delivered from another public water supply;
- d. Excess finished water storage capacity.

Under the first option listed above, the City's baseline water withdrawal capacity from the Flint River, and rated capacity of the City's water treatment plant (WTP), both exceed its finished water supply requirements. The rated capacity of a complete treatment system is established under Rule 1006 (R 325.11006). In accordance with this rule, the Department of Environmental Quality (DEQ) has established a rated capacity of 36 million gallons per day for the City's WTP, which again far exceeds current and future finished water supply requirements for the City's service area.

In addition, while capacity under item d above for excess finished water storage has not been established, the City currently has enough finished water storage to supply more than 2 days of normal finished water supply requirements.

Rule 1206 (R 325.11206) requires water systems to provide a means to continuously supply fully finished water during normal power service interruption. The City's WTP is now equipped with a redundant electrical system that includes provisions for stand-by power generation; thus meeting this requirement.

While additional means to meet the above requirements for capacity and power interruption can be provided through contracted interconnections with other water systems, the City has demonstrated compliance with these requirements without such means. However, the DEQ still supports and encourages such interconnections be maintained for emergency purposes as an additional barrier to help maintain public health protections. While these emergency

Mr. Daugherty Johnson

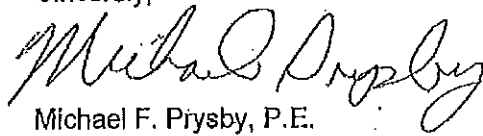
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April 29, 2014

interconnections have no requirement to establish an available or contracted capacity, the DEQ encourages the corresponding utilities to establish mutual aid agreements where possible. Such agreements can be developed through the Michigan Water/Wastewater Agency Response Network (MiWARN). For more information, please visit miwarn.org. A MiWARN brochure is also enclosed for your information.

If you have any questions, feel free to contact me at (517) 290-8817; prysbym@michigan.gov; or Department of Environmental Quality, Office of Drinking Water and Municipal Assistance, Lansing District Office, 525 West Allegan Street, 1st Floor South, P.O. Box 30242, Lansing, Michigan 48909-7742.

Sincerely,



Michael F. Prysby, P.E.
District Engineer
Field Operations Section
Office of Drinking Water and
Municipal Assistance

mfp/jlr
Enclosure

cc: Mr. Howard Kroft, Utilities Director, City of Flint



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE



DAN WYANT
DIRECTOR

April 16, 2014

Mr. Brent Wright
City Of Flint – D.P.W
Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Revised Drinking Water Monitoring Schedule – 2014
Monthly Operation Reports
Siting Plans and Record Keeping

Monitoring Schedule:

Enclosed is your revised Drinking Water Monitoring Schedule for calendar year 2014 outlining the minimum requirements for your public water supply. Your schedule has been revised based on the City's intent to change the source of its drinking water from the Detroit Water and Sewerage Department to treatment of the Flint River utilizing the City's Water Treatment Plant. Collect samples early in the monitoring period of the year indicated on the schedule. If you use a private laboratory you are required to report the results to us within the first ten days of the month following the month that you received the results. To receive credit for monitoring, the "WSSN" (water supply serial number), the "Site Code," and "County" must appear on the sample result. Bottles will NOT be mailed automatically. If you use the Department of Environmental Quality Laboratory, you can order bottles by calling 517-335-8184. Be certain of the United States Environmental Protection Agency sampling and analysis method requirements for hold times.

Please note that both distribution and entry point to the distribution system monitoring will increase upon plant startup.

Monthly Operation Report (MOR) Requirements:

The City shall submit MORs as required under Administrative Rule 1502 (R325.11502). In addition to plant operational data collected and as noted in the attached schedule, the City of Flint will be required to collect Total Organic Compounds (TOC) samples from the source and finish water on a monthly basis. You will also be required to collect Water Quality Parameters (WQPs) at your entry point every 2 weeks. The City must also demonstrate adequate contact time (CT) for disinfection in accordance with Administrative Rule 1505a (R325.11505a).

Mr. Brent Wright

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April 16, 2014

Disinfection By-Product Sample Siting Plans:

The City of Flint must return to routine standard monitoring of disinfection by-products, and a revised Disinfection & Disinfectants By-Product (DDBP) plan must be submitted, which identifies 4 additional sites, 8 sites in total, for routine quarterly monitoring. These sites must be selected in accordance with the Stage 2 DDBP Rule and supporting documentation must be submitted with the plan for review and approval by this office prior to monitoring.

Lead and Copper Monitoring Requirements and Site Sample Pool

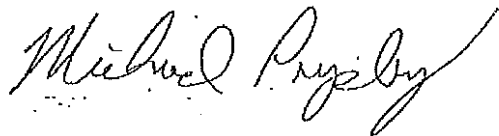
This change in source also increases your distribution system monitoring for WQPs to 25 samples per 6 months and 100 sample locations for Lead & Copper for 2 consecutive 6 month rounds of monitoring. The City will need to expand its current sample site pool in accordance with the requirements of Administrative Rule 710a (R325.10710a). A list of the proposed sample site pool locations, including each site's Tier, sample category, service material, and building plumbing material, shall be submitted to this office for review and approval.

Record Keeping:

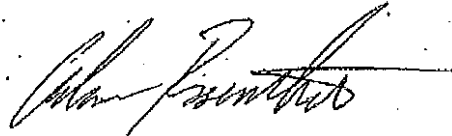
The City shall maintain all monitoring records in accordance with all applicable requirements under the Administrative Rules including Rule 720a (R325.10720a), Rule 1506 (R325.11506), and Rule 1507 (R325.11507).

The Michigan Safe Drinking Water Act requires certain reports to be submitted to this office each year. Please remember that cross connection reports and annual pumpage reports are due by March 31, and the **Consumer Confidence Report** is due by July 1.

Also enclosed is the document "2014 Monitoring and Reporting Requirements." This provides additional details about monitoring and reporting requirements. If you have any questions, please contact us by telephone or e-mail using the information below.



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



Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-284-6644

Enclosure

cc/encl: Mr. Robert Bisnick, City Of Flint
Genesee Co. Health Dept.

2014 Monitoring and Reporting Requirements

Please Monitor Early: Collect samples early in the monitoring period (month, quarter, year) of the year indicated on the schedule. Bacteriological and partial chemistry samples should be collected close to the shipping time and sent overnight delivery to assure sample holding times are not exceeded (30 and 48 hour hold times respectively). We also recommend avoiding mailing bacteriological samples immediately preceding or following a holiday because samples tend to exceed the 30 hour hold time. When this occurs, a repeat sample must be collected as soon as possible upon notification.

If you use a private laboratory please report the results to us within the first ten days of the month following the month that you received the results. A list of certified laboratories is available on request. If samples are not collected as indicated on your monitoring schedule, you will incur a monitoring violation and may also be subject to a fine. For information on the fines policy, visit <http://michigan.gov/deq>. Click on Water, Drinking Water, Community Water Supply, and Administrative Fines (under Laws and Rules).

To receive credit for monitoring, you must include the "WSSN" (water supply serial number), the "Site Code," and the "County" when you submit samples for analysis. Site codes are listed on your monitoring schedule.

Special Instructions If You Use The DEQ Laboratory: Bottles will NOT be mailed automatically. To order bottles, call the DEQ Laboratory at 517-335-8184 or download the form EQP 2301 *Requisition for Water Sample Units* from www.michigan.gov/deq. Click on Key Topics, Laboratory Services, Drinking Water, Obtaining The Necessary Sampling Units, and 'test list'. Please note that the DEQ laboratory is closed on most state holidays. The DEQ laboratory prices are subject to change without notice.

Special Instructions For Automated Partial Chemistry, VOC and TTHM Samples: These sample bottles must be cooled and preserved during shipment to the laboratory. If you use the DEQ laboratory, you will receive the ice pack, acid dropper (if necessary) and small cooler when you request the bottles. Samples must be preserved correctly to be used for compliance purposes. To avoid resampling follow instructions contained with the sample bottle. If you would like more information, contact the DEQ lab, at 517-335-8184, or contact this office.

Cyanide: Previously, supplies that chlorinated the water were waived from monitoring for cyanide. The U.S. EPA now requires all supplies to sample the entry point for cyanide.

UCMR3 Monitoring: You may have monitoring requirements in 2014 under the third Unregulated Contaminant Monitoring Rule (UCMR3). The U.S. EPA will contact you directly if your water supply is required to monitor in 2014. A list of laboratories certified to analyze the samples collected for UCMR3 is available at <http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/upload/lablist.pdf>. Contact the U.S. EPA with questions.

Reminder if Lead and Copper Monitoring Due This Year: You must provide individual lead tap results to people who receive water from sites that were sampled, even if lead

was not detected, within 30 days of learning of results. You must also send us a certification that you met all the delivery requirements along with a sample copy of the customer notice within 3 months after the end of the monitoring period. Water supplies that failed to distribute the Consumer Notice of Lead Results must include the following statement in their CCR, "During the year, we failed to provide lead results to persons served at the sites that were tested as required by the Lead and Copper Rule." To download the *Lead and Copper Report and Consumer Notice of Lead Result Certificate* in Microsoft Word or PDF format, visit www.michigan.gov/deq. Click on Water, Drinking Water, Community Water Supply, and Reporting Forms (under Manuals, Forms & Brochures).

Annual Reports: Act 399 requires certain reports to be submitted to this office each year.

- The **Cross Connection Report**, due by March 31, describes the status of your local cross connection control program. Manufactured housing communities are exempt from this requirements until 2016.

Each year, water supplies must submit a report regardless of whether a formal program has been implemented. If cross connections do not exist in your water system, indicate so on the report. Download the Cross Connection Report form from <http://michigan.gov/deq>. Click on Water, Drinking Water, Community Water Supply, Reporting Forms (under Manuals, Forms & Brochures). Instructions are included with the form.

- The **Annual Pumpage/Usage Report**, due by March 31, is required of water supplies that do not submit monthly operation reports.

A summary of water pumpage and water use must be submitted by each water supply that does not submit a monthly operation report. To manage our natural resources, pumpage data are compiled to determine water use demands in Michigan. Download the Annual Pumpage/Usage Report form from <http://michigan.gov/deq>. Click on Water, Drinking Water, Community Water Supply, Reporting Forms (under Manuals, Forms & Brochures). Please be sure to indicate the appropriate units on the report (e.g. million gallons or gallons).

- The **Consumer Confidence Report**, due by July 1 to your customers, to your local health department and to this office.

Electronic delivery methods may be used to distribute the CCR to bill-paying customers, provided they are direct. For more information on e-delivery, visit www.michigan.gov/deq. Click on Water, Drinking Water, Community Water Supply, Consumer Confidence Report Rule (under Laws and Rules).

2014 Monitoring Schedule

FLINT, CITY OF

WSSN: 02310

Collect samples early in the monitoring period. This schedule reflects your expected routine monitoring and is subject to change. To receive credit for monitoring, include the WSSN, Site Code, and County on your request for analysis form. Collect Bacteriological and Automated Partial Chemistry samples close to the shipping time and send overnight delivery. Send all sample results to your Department of Environmental Quality (DEQ) district office unless you use the DEQ laboratory. Test codes, sample units, and costs are listed to help you complete the DEQ laboratory form. Prices are subject to change without notice. The DEQ laboratory is closed on state holidays.

Location: Plant Tap

Collect these samples at the entry point to the distribution system (after treatment, if applicable.)

Sample Type	# Samples/ Frequency	Collect Before	Site Code	Fee	Unit Number	Test Code
Automated Partial Chemistry	This DEQ lab scan includes nitrate, nitrite, fluoride, and sodium whose monitoring frequency requirements differ from one another. Before requesting analyses from a laboratory other than the DEQ laboratory, check with your DEQ district staff for the specific monitoring requirements.					
	1/3 months	Quarterly	TP001	\$18.00	32	R
Volatile Organic Compounds	1/3 months	Quarterly	TP001	\$100.00	36VO	CXVO
Complete Metals	1/36 months	09/30/2014	TP001	\$102.00	36ME	CMET2
Arsenic	1/3 months	Quarterly	TP001	\$18.00	36ME	CAS
Cyanide	1/3 months	Quarterly	TP001	\$25.00	36CNa	CCN
SOC – Pesticides	1/3 months	Quarterly	TP001	\$125.00	36PT	CXPT
SOC – Herbicides	1/3 months	Quarterly	TP001	\$120.00	36HB	CXHB
SOC – Carbamates	1/3 months	Quarterly	TP001	\$120.00	36LP	CXLP
Gross Alpha (Radiological)	1/3 months	Quarterly	TP001	Not performed at the DEQ Laboratory. A list of certified labs is at www.michigan.gov/DEQ . Select Water, Drinking Water, Community Water Supply, then Certified Labs under Programs and Activities.		
Radium 226 & Radium 228	1/3 months	Quarterly	TP001			
Water Quality Parameters	Bi-weekly	Every 2 Weeks	TP001	Various	Various	Various
Total Organic Carbon (TOC)	Pair/Monthly	Monthly	TP001	\$35.00	36TO	CTOC
	Monitor for TOC in the source water before any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as "paired samples." Collect the treated water sample not later than the point of combined filter effluent turbidity monitoring and representative of treated water.					
Expanded SOCs						
Dalapon & Haloacetic Acids	1/12 months	Between 04/01 and 09/30/2014	TP001	\$130.00	36HA	CXHA
Diquate	1/12 months	Between 04/01 and 09/30/2014	TP001	\$150.00	36DQ	CXDQ
Endothall	1/12 months	Between 04/01 and 09/30/2014	TP001	\$150.00	36EN	CXEN
EDB & DBCP	1/12 months	Between 04/01 and 09/30/2014	TP001	\$70.00	36VO	CXEV

2014 Monitoring Schedule

FLINT, CITY OF
WSSN: 02310

Collect samples early in the monitoring period. This schedule reflects your expected routine monitoring and is subject to change. To receive credit for monitoring, include the WSSN, Site Code, and County on your request for analysis form. Collect Bacteriological and Automated Partial Chemistry samples close to the shipping time and send overnight delivery. Send all sample results to your Department of Environmental Quality (DEQ) district office unless you use the DEQ laboratory. Test codes, sample units, and costs are listed to help you complete the DEQ laboratory form. Prices are subject to change without notice. The DEQ laboratory is closed on state holidays.

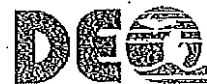
Location: Distribution System

Sample Type	Collect Samples According to the	# Samples/ Frequency	Collect	Site Code	Fee	Unit Number	Test Code
Bacteriological – coliforms	TCR Sampling Site Plan	100/Monthly	Monthly	DIST	\$16.00	30	BPTC
Chlorine Residual	DBP Monitoring Plan	Measure the residual disinfectant level at the same point and at the same time as the bacteriological sample and report the average to the DEQ.					
Lead Copper for Corrosion Control	Lead and Copper Sampling Pool	100/6 months	Between 07/01 and 12/31/2014	DIST	\$26.00	36CC	CCUB
Water Quality Parameters	Representative Sites	25/Quarterly	Quarterly	DIST	Various	Various	Various
Total Trihalomethanes	DBP Monitoring Plan	8/3 months	During February, May, August and November 2014	See DBP Monitoring Plan	\$65.00	36VO	CXTM
Haloacetic Acids		8/3 months	During February, May, August and November 2014	See DBP Monitoring Plan	\$130.00	36HA	CXHA



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE



DAN WYANT
DIRECTOR

February 26, 2014

Mr. Brent Wright
City Of Flint - D P W
Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Drinking Water Monitoring Schedule – 2014
Annual Reports

Enclosed is your Drinking Water Monitoring Schedule for calendar year 2014 outlining the minimum requirements for your public water supply. Collect samples early in the monitoring period of the year indicated on the schedule. If you use a private laboratory you are required to report the results to us within the first ten days of the month following the month that you received the results. To receive credit for monitoring, the "WSSN" (water supply serial number), the "Site Code," and "County" must appear on the sample result. Bottles will NOT be mailed automatically. If you use the DEQ Laboratory, you can order bottles by calling 517-335-8184. Be certain of the EPA sampling and analysis method requirements for hold times.

The Michigan Safe Drinking Water Act requires certain reports to be submitted to this office each year. Please remember that cross connection reports and annual pumpage reports are due by March 31, and the Consumer Confidence Report is due by July 1.

Also enclosed is the document "2014 Monitoring and Reporting Requirements." This provides additional details about monitoring and reporting requirements. If you have any questions, please contact us by telephone or email using the information below.

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

Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water and
Municipal Assistance
517-284-6644

MFP:AR:JR
Enclosure

cc/encl: Mr. Robert Bisnick, City Of Flint

Rennaker, Joanne (DEQ)

From: Feuerstein, Heather (DEQ)
Sent: Thursday, November 05, 2015 2:09 PM
To: Busch, Stephen (DEQ); Krisztian, George (DEQ)
Subject: Freeman Elementary Final Lead and Copper Results.xlsx
Attachments: Freeman Elementary Sample-Assessment-Recommendations-Draft 11-4-15.docx;
Freeman Elementary Final Lead and Copper Results.xlsx

For final review

**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 a comprehensive 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/fountains 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 order 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 the fourth 125-milliliter sample (F2) was collected.—These samples were used to determine the impact of any lead sources in and around each specific faucet/fountain and its connecting plumbing.

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On Saturday, October 31, 2015, the DEQ separately completed consecutive sampling at three of the 31 faucets/fountains following a stagnation period of approximately 12 hours. This sampling was used to determine the impact of any lead sources located deep in the supply plumbing.—These three sites were selected based on their relative location within the school building plumbing: included one site near the building service line, one site near the plumbing mid-point, and one site at the far end of the plumbing system.—At each of these three locations/sites, staff collected 10, 1-liter samples.—Each sample was one liter in volume, and the 40The 10 samples were collected immediately after turning on the tap, and consecutively, without any flushing time in between immediately after turning on the tap without letting water run down the drain.—These samples were used to determine the impact of any lead sources from the larger diameter supply plumbing within the school building.

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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.—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.

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 and stagnation is likely to reduce lead concentrations and lead exposure.

**Outlet: Sink Faucet (CF029)**

Location: DHHS Office, west wall

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

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 (CF014)
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 1/2-inch brass nipple on the underside of the sink. This may explain the higher concentrations in the first two samples. 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.

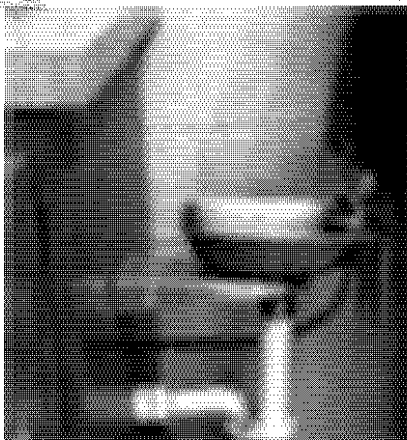
Outlet: Bubbler fountain (CF031)

Location: Rainbow 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 requiring no further action, several recommendations have been identified.

The fourth sample at each of these 22 outlets following approximately three 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.

Several Twelve 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. These faucets/fountains include:

This includes:

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

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

The remaining 10 outlets did not showed sample demonstrate any lead results of 15 parts per billion or less, higher than 15 ppb and requiring no further action or additional recommendations are not made of similar materials to the nine outlets with elevated lead results. These faucets/fountains include: Steve please fill in this information:

- Sink Faucets in Classroom 1 (CF004), Classroom 15 (CF017), Classroom 17 (CF019), Classroom 12 (CF021), Classroom 19 (CF023), Classroom 14 (CF025), Classroom 21 (CF027), Rainbow Pre-K Room (CF030).
- Kitchen Sink (cold) in the Community Room (KC003).
- Sink Side Bubbler Fountain in Classroom 11 (CF016).

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Consecutive Sampling Results and Building Plumbing Recommendations

The 30 consecutive samples taken at three sites in the building on October 31, 2015, provide additional confirmation that the highest contribution of lead appears to be from the individual faucet/fountains and not from the larger diameter supply plumbing within the school building.

Consecutive Sample No.	1	2	3	4	5	6	7	8	9	10
Location	Lead Result (parts per billion; ND = not-detected)									
Rainbow Pre-K Rm Sink Faucet (CF030)	2	1	ND	ND	ND	ND	ND	ND	ND	ND
Classroom 11 Sink Faucet (CF015)	62	8	8	7	7	7	7	6	6	6
Classroom 21 Sink Faucet (CF027)	2	ND	ND	ND	ND	ND	ND	ND	ND	ND

The continued presence of lead in samples collected at Classroom 11 (CF015) may be a result of lead particulates caught in the aerator/screen installed on the faucet outlet, or may be from a source of lead further back in the plumbing system. However, the non-detect results from consecutive samples collected in Rainbow Pre-K Room (CF030) and Classroom 21 (CF027) suggest any additional source of lead associated with Classroom 11 (CF015) is localized to the plumbing branch serving this faucet. The faucet aerator/screen in Classroom 11 (CF015) should be removed and inspected before completing a more in-depth plumbing analysis. Consecutive sampling results at Classroom 11 (CF015) support the water use restrictions specified for this outlet.

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Sample Number	ANALYTE	RESULT (mg/l)	Sample Location	Sample Description	Site Code
LF88751	Lead	0.010	Classroom 12	CF022	P1
LF88752	Lead	0.003	Classroom 12	CF022	P2
LF88753	Lead	0.001	Classroom 12	CF022	F01
LF88754	Lead	0.001	Classroom 12	CF022	F02
LF88755	Lead	0.004	Classroom 12	CF021	P1
LF88756	Lead	0.007	Classroom 12	CF021	P2
LF88757	Lead	0.000	Classroom 12	CF021	F01
LF88758	Lead	0.000	Classroom 12	CF021	F02
LF88759	Lead	0.009	Classroom 5	CF009	P1
LF88760	Lead	0.002	Classroom 5	CF009	P2
LF88761	Lead	0.002	Classroom 5	CF009	F01
LF88762	Lead	0.001	Classroom 5	CF009	F02
LF88763	Lead	0.009	Classroom 11	CF015	P1
LF88764	Lead	0.006	Classroom 11	CF015	P2
LF88765	Lead	0.014	Classroom 11	CF015	F01
LF88766	Lead	0.011	Classroom 11	CF015	F02
LF88767	Lead	0.003	Classroom 11	CF016	P1
LF88768	Lead	0.003	Classroom 11	CF016	P2
LF88769	Lead	0.005	Classroom 11	CF016	F01
LF88770	Lead	0.004	Classroom 11	CF016	F02
LF88771	Lead	0.009	Classroom 21	CF027	P1
LF88772	Lead	0.007	Classroom 21	CF027	P2
LF88773	Lead	0.000	Classroom 21	CF027	F01
LF88774	Lead	0.000	Classroom 21	CF027	F02
LF88775	Lead	0.012	Classroom 6	CF010	P1
LF88776	Lead	0.004	Classroom 6	CF010	P2
LF88777	Lead	0.002	Classroom 6	CF010	F01
LF88778	Lead	0.000	Classroom 6	CF010	F02
LF88779	Lead	0.009	Classroom 21	CF028	P1
LF88780	Lead	0.002	Classroom 21	CF028	P2
LF88781	Lead	0.001	Classroom 21	CF028	F01
LF88782	Lead	0.001	Classroom 21	CF028	F02
LF88783	Lead	0.003	Classroom 19	CF024	P1
LF88784	Lead	0.003	Classroom 19	CF024	P2
LF88785	Lead	0.004	Classroom 19	CF024	F01
LF88786	Lead	0.003	Classroom 19	CF024	F02
LF88787	Lead	0.005	Community Room	KC003	P1
LF88788	Lead	0.002	Community Room	KC003	P2
LF88789	Lead	0.000	Community Room	KC003	F01
LF88790	Lead	0.000	Community Room	KC003	F02
LF88791	Lead	0.009	Classroom 19	CF023	P1
LF88792	Lead	0.009	Classroom 19	CF023	P2
LF88793	Lead	0.001	Classroom 19	CF023	F01
LF88794	Lead	0.000	Classroom 19	CF023	F02
LF88795	Lead	0.015	Hallway	DW002	P1
LF88796	Lead	0.006	Hallway	DW002	P2
LF88797	Lead	0.004	Hallway	DW002	F01
LF88798	Lead	0.001	Hallway	DW002	F02
LF88799	Lead	0.002	Classroom 9	CF012	P1
LF88800	Lead	0.004	Classroom 9	CF012	P2
LF88801	Lead	0.002	Classroom 9	CF012	F01
LF88802	Lead	0.000	Classroom 9	CF012	F02
LF88803	Lead	0.006	Hallway	DW001	P1
LF88804	Lead	0.006	Hallway	DW001	P2
LF88805	Lead	0.004	Hallway	DW001	F01

Sample Number	ANALYTE	RESULT (mg/l)	Sample Location	Sample Description	Site Code
LF88806	Lead	0.001	Hallway	DW001	F02
LF88807	Lead	0.014	Classroom 15	CF018	P1
LF88808	Lead	0.005	Classroom 15	CF018	P2
LF88809	Lead	0.002	Classroom 15	CF018	F01
LF88810	Lead	0.002	Classroom 15	CF018	F02
LF88811	Lead	0.010	Classroom 15	CF017	P1
LF88812	Lead	0.014	Classroom 15	CF017	P2
LF88813	Lead	0.002	Classroom 15	CF017	F01
LF88814	Lead	0.002	Classroom 15	CF017	F02
LF88815	Lead	0.012	DHHS Office	CF029	P1
LF88816	Lead	0.012	DHHS Office	CF029	P2
LF88817	Lead	0.002	DHHS Office	CF029	F01
LF88818	Lead	0.000	DHHS Office	CF029	F02
LF88819	Lead	0.013	Classroom 4	CF008	P1
LF88820	Lead	0.006	Classroom 4	CF008	P2
LF88821	Lead	0.001	Classroom 4	CF008	F01
LF88822	Lead	0.000	Classroom 4	CF008	F02
LF88823	Lead	0.007	Classroom 3	CF007	P1
LF88824	Lead	0.006	Classroom 3	CF007	P2
LF88825	Lead	0.003	Classroom 3	CF007	F01
LF88826	Lead	0.002	Classroom 3	CF007	F02
LF88827	Lead	0.007	Classroom 10	CF014	P1
LF88828	Lead	0.007	Classroom 10	CF014	P2
LF88829	Lead	0.004	Classroom 10	CF014	F01
LF88830	Lead	0.003	Classroom 10	CF014	F02
LF88831	Lead	0.004	Classroom 14	CF026	P1
LF88832	Lead	0.003	Classroom 14	CF026	P2
LF88833	Lead	0.002	Classroom 14	CF026	F01
LF88834	Lead	0.004	Classroom 14	CF026	F02
LF88835	Lead	0.005	Classroom 17	CF019	P1
LF88836	Lead	0.003	Classroom 17	CF019	P2
LF88837	Lead	0.001	Classroom 17	CF019	F01
LF88838	Lead	0.000	Classroom 17	CF019	F02
LF88839	Lead	0.000	Classroom 14	CF025	P1
LF88840	Lead	0.003	Classroom 14	CF025	P2
LF88841	Lead	0.003	Classroom 14	CF025	F01
LF88842	Lead	0.002	Classroom 14	CF025	F02
LF88843	Lead	0.009	Classroom 10	CF013	P1
LF88844	Lead	0.003	Classroom 10	CF013	P2
LF88845	Lead	0.003	Classroom 10	CF013	F02
LF88846	Lead	0.003	Classroom 10	CF013	F01
LF88847	Lead	0.013	Classroom 17	CF020	P1
LF88848	Lead	0.004	Classroom 17	CF020	P2
LF88849	Lead	0.005	Classroom 17	CF020	F01
LF88850	Lead	0.003	Classroom 17	CF020	F02
LF88851	Lead	0.003	Classroom 2	CF006	P1
LF88852	Lead	0.003	Classroom 2	CF006	P2
LF88853	Lead	0.001	Classroom 2	CF006	F01
LF88854	Lead	0.001	Classroom 2	CF006	F02
LF88855	Lead	0.002	Classroom 7	CF011	P1
LF88856	Lead	0.000	Classroom 7	CF011	P2
LF88857	Lead	0.002	Classroom 7	CF011	F01
LF88858	Lead	0.000	Classroom 7	CF011	F02
LF88859	Lead	0.003	Rainbow Pre K	CF031	P1
LF88860	Lead	0.003	Rainbow Pre K	CF031	P2

Sample Number	ANALYTE	RESULT (mg/l)	Sample Location	Sample Description	Site Code
LF88861	Lead	0.002	Rainbow Pre K	CF031	F01
LF88862	Lead	0.000	Rainbow Pre K	CF031	F02
LF88863	Lead	0.010	Rainbow Pre K	CF030	P1
LF88864	Lead	0.003	Rainbow Pre K	CF030	P2
LF88865	Lead	0.007	Rainbow Pre K	CF030	F01
LF88866	Lead	0.000	Rainbow Pre K	CF030	F02
LF88867	Lead	0.012	Classroom 1	CF004	P1
LF88868	Lead	0.007	Classroom 1	CF004	P2
LF88869	Lead	0.004	Classroom 1	CF004	F01
LF88870	Lead	0.002	Classroom 1	CF004	F02
LF88871	Lead	0.005	Classroom 1	DW005	P1
LF88872	Lead	0.003	Classroom 1	DW005	P2
LF88873	Lead	0.003	Classroom 1	DW005	F01
LF88874	Lead	0.002	Classroom 1	DW005	F02
LF89553	Lead	0.002	Rainbow Pre K	CF030	CA1
LF89554	Lead	0.001	Rainbow Pre K	CF030	CA2
LF89555	Lead	0.000	Rainbow Pre K	CF030	CA3
LF89556	Lead	0.000	Rainbow Pre K	CF030	CA4
LF89557	Lead	0.000	Rainbow Pre K	CF030	CA5
LF89558	Lead	0.000	Rainbow Pre K	CF030	CA6
LF89559	Lead	0.000	Rainbow Pre K	CF030	CA7
LF89560	Lead	0.000	Rainbow Pre K	CF030	CA8
LF89561	Lead	0.000	Rainbow Pre K	CF030	CA9
LF89562	Lead	0.000	Rainbow Pre K	CF030	CA10
LF89563	Lead	0.002	Classroom 11	CF015	CB1
LF89564	Lead	0.008	Classroom 11	CF015	CB2
LF89565	Lead	0.008	Classroom 11	CF015	CB3
LF89566	Lead	0.007	Classroom 11	CF015	CB4
LF89567	Lead	0.007	Classroom 11	CF015	CB5
LF89568	Lead	0.007	Classroom 11	CF015	CB6
LF89569	Lead	0.007	Classroom 11	CF015	CB7
LF89570	Lead	0.006	Classroom 11	CF015	CB8
LF89571	Lead	0.006	Classroom 11	CF015	CB9
LF89572	Lead	0.006	Classroom 11	CF015	CB10
LF89573	Lead	0.002	Classroom 21	CF027	CC1
LF89574	Lead	0.000	Classroom 21	CF027	CC2
LF89575	Lead	0.000	Classroom 21	CF027	CC3
LF89576	Lead	0.000	Classroom 21	CF027	CC4
LF89577	Lead	0.000	Classroom 21	CF027	CC5
LF89578	Lead	0.000	Classroom 21	CF027	CC6
LF89579	Lead	0.000	Classroom 21	CF027	CC7
LF89580	Lead	0.000	Classroom 21	CF027	CC8
LF89581	Lead	0.000	Classroom 21	CF027	CC9
LF89582	Lead	0.000	Classroom 21	CF027	CC10

Note: Results of "Not Detected" have been converted to a numerical value of zero to allow for ease of

Results in RED exceed 15 ppb

1 ppb = 0.001 mg/l

Site Code Description

Site Code Description
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Primary draw of 125 milliliters
Second Primary draw of 125 milliliters
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Primary draw of 125 milliliters
Second Primary draw of 125 milliliters
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Primary draw of 125 milliliters
Second Primary draw of 125 milliliters
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Sequential Sample
Second Sequential Sample
Third Sequential Sample
Forth Sequential Sample
Fifth Sequential Sample
Sixth Sequential Sample
Seventh Sequential Sample
Eigth Sequential Sample
Ninth Sequential Sample
Tenth Sequential Sample
First Sequential Sample
Second Sequential Sample
Third Sequential Sample
Forth Sequential Sample
Fifth Sequential Sample
Sixth Sequential Sample
Seventh Sequential Sample
Eigth Sequential Sample
Ninth Sequential Sample
Tenth Sequential Sample
First Sequential Sample
Second Sequential Sample
Third Sequential Sample
Forth Sequential Sample
Fifth Sequential Sample
Sixth Sequential Sample
Seventh Sequential Sample
Eigth Sequential Sample
Ninth Sequential Sample
Tenth Sequential Sample

Sample Number	ANALYTE	RESULT	Sample Location	Sample Description	Site Code
LF88751	Copper	0.32	Classroom 12	CF022	P1
LF88752	Copper	0.17	Classroom 12	CF022	P2
LF88753	Copper	0.15	Classroom 12	CF022	F01
LF88754	Copper	0.15	Classroom 12	CF022	F02
LF88755	Copper	0.09	Classroom 12	CF021	P1
LF88756	Copper	0.15	Classroom 12	CF021	P2
LF88757	Copper	0.14	Classroom 12	CF021	F01
LF88758	Copper	0.15	Classroom 12	CF021	F02
LF88759	Copper	0.31	Classroom 5	CF009	P1
LF88760	Copper	0.28	Classroom 5	CF009	P2
LF88761	Copper	0.08	Classroom 5	CF009	F01
LF88762	Copper	0.07	Classroom 5	CF009	F02
LF88763	Copper	0.43	Classroom 11	CF015	P1
LF88764	Copper	0.66	Classroom 11	CF015	P2
LF88765	Copper	0.19	Classroom 11	CF015	F01
LF88766	Copper	0.13	Classroom 11	CF015	F02
LF88767	Copper	0.99	Classroom 11	CF016	P1
LF88768	Copper	0.89	Classroom 11	CF016	P2
LF88769	Copper	0.16	Classroom 11	CF016	F01
LF88770	Copper	0.13	Classroom 11	CF016	F02
LF88771	Copper	0.19	Classroom 21	CF027	P1
LF88772	Copper	0.21	Classroom 21	CF027	P2
LF88773	Copper	0.16	Classroom 21	CF027	F01
LF88774	Copper	0.15	Classroom 21	CF027	F02
LF88775	Copper	0.24	Classroom 6	CF010	P1
LF88776	Copper	0.22	Classroom 6	CF010	P2
LF88777	Copper	0.17	Classroom 6	CF010	F01
LF88778	Copper	0.12	Classroom 6	CF010	F02
LF88779	Copper	0.17	Classroom 21	CF028	P1
LF88780	Copper	0.16	Classroom 21	CF028	P2
LF88781	Copper	0.15	Classroom 21	CF028	F01
LF88782	Copper	0.15	Classroom 21	CF028	F02
LF88783	Copper	0.23	Classroom 19	CF024	P1
LF88784	Copper	0.17	Classroom 19	CF024	P2
LF88785	Copper	0.16	Classroom 19	CF024	F01
LF88786	Copper	0.16	Classroom 19	CF024	F02
LF88787	Copper	0.31	Community Room	KC003	P1
LF88788	Copper	0.27	Community Room	KC003	P2
LF88789	Copper	0.14	Community Room	KC003	F01
LF88790	Copper	0.13	Community Room	KC003	F02
LF88791	Copper	0.13	Classroom 19	CF023	P1
LF88792	Copper	0.18	Classroom 19	CF023	P2
LF88793	Copper	0.15	Classroom 19	CF023	F01
LF88794	Copper	0.15	Classroom 19	CF023	F02
LF88795	Copper	0.21	Hallway	DW002	P1
LF88796	Copper	0.10	Hallway	DW002	P2
LF88797	Copper	0.07	Hallway	DW002	F01
LF88798	Copper	0.00	Hallway	DW002	F02
LF88799	Copper	0.23	Classroom 9	CF012	P1
LF88800	Copper	0.16	Classroom 9	CF012	P2
LF88801	Copper	0.11	Classroom 9	CF012	F01
LF88802	Copper	0.08	Classroom 9	CF012	F02

LF88803	Copper	0.41	Hallway	DW001	P1
LF88804	Copper	0.29	Hallway	DW001	P2
LF88805	Copper	0.17	Hallway	DW001	F01
LF88806	Copper	0.00	Hallway	DW001	F02
LF88807	Copper	0.20	Classroom 15	CF018	P1
LF88808	Copper	0.17	Classroom 15	CF018	P2
LF88809	Copper	0.14	Classroom 15	CF018	F01
LF88810	Copper	0.14	Classroom 15	CF018	F02
LF88811	Copper	0.17	Classroom 15	CF017	P1
LF88812	Copper	0.29	Classroom 15	CF017	P2
LF88813	Copper	0.17	Classroom 15	CF017	F01
LF88814	Copper	0.15	Classroom 15	CF017	F02
LF88815	Copper	0.59	DHS Health Office	CF029	P1
LF88816	Copper	0.40	DHS Health Office	CF029	P2
LF88817	Copper	0.08	DHS Health Office	CF029	F01
LF88818	Copper	0.00	DHS Health Office	CF029	F02
LF88819	Copper	0.28	Classroom 4	CF008	P1
LF88820	Copper	0.54	Classroom 4	CF008	P2
LF88821	Copper	0.17	Classroom 4	CF008	F01
LF88822	Copper	0.15	Classroom 4	CF008	F02
LF88823	Copper	0.17	Classroom 3	CF007	P1
LF88824	Copper	0.27	Classroom 3	CF007	P2
LF88825	Copper	0.09	Classroom 3	CF007	F01
LF88826	Copper	0.07	Classroom 3	CF007	F02
LF88827	Copper	0.11	Classroom 10	CF014	P1
LF88828	Copper	0.10	Classroom 10	CF014	P2
LF88829	Copper	0.10	Classroom 10	CF014	F01
LF88830	Copper	0.08	Classroom 10	CF014	F02
LF88831	Copper	0.75	Classroom 14	CF026	P1
LF88832	Copper	0.66	Classroom 14	CF026	P2
LF88833	Copper	0.35	Classroom 14	CF026	F01
LF88834	Copper	0.20	Classroom 14	CF026	F02
LF88835	Copper	0.16	Classroom 17	CF019	P1
LF88836	Copper	0.15	Classroom 17	CF019	P2
LF88837	Copper	0.14	Classroom 17	CF019	F01
LF88838	Copper	0.14	Classroom 17	CF019	F02
LF88839	Copper	0.14	Classroom 14	CF025	P1
LF88840	Copper	0.25	Classroom 14	CF025	P2
LF88841	Copper	0.17	Classroom 14	CF025	F01
LF88842	Copper	0.18	Classroom 14	CF025	F02
LF88843	Copper	0.06	Classroom 10	CF013	P1
LF88844	Copper	0.07	Classroom 10	CF013	P2
LF88845	Copper	0.10	Classroom 10	CF013	F02
LF88846	Copper	0.19	Classroom 10	CF013	F01
LF88847	Copper	0.19	Classroom 17	CF020	P1
LF88848	Copper	0.16	Classroom 17	CF020	P2
LF88849	Copper	0.16	Classroom 17	CF020	F01
LF88850	Copper	0.14	Classroom 17	CF020	F02
LF88851	Copper	0.17	Classroom 2	CF006	P1
LF88852	Copper	0.22	Classroom 2	CF006	P2
LF88853	Copper	0.11	Classroom 2	CF006	F01
LF88854	Copper	0.11	Classroom 2	CF006	F02
LF88855	Copper	0.20	Classroom 7	CF011	P1
LF88856	Copper	0.15	Classroom 7	CF011	P2
LF88857	Copper	0.11	Classroom 7	CF011	F01

LF88858	Copper	0.06	Classroom 7	CF011	F02
LF88859	Copper	0.38	Rainbow Pre K	CF031	P1
LF88860	Copper	0.21	Rainbow Pre K	CF031	P2
LF88861	Copper	0.27	Rainbow Pre K	CF031	F01
LF88862	Copper	0.19	Rainbow Pre K	CF031	F02
LF88863	Copper	0.38	Rainbow Pre K	CF030	P1
LF88864	Copper	0.42	Rainbow Pre K	CF030	P2
LF88865	Copper	0.59	Rainbow Pre K	CF030	F01
LF88866	Copper	0.21	Rainbow Pre K	CF030	F02
LF88867	Copper	0.27	Classroom 1	CF004	P1
LF88868	Copper	0.25	Classroom 1	CF004	P2
LF88869	Copper	0.21	Classroom 1	CF004	F01
LF88870	Copper	0.08	Classroom 1	CF004	F02
LF88871	Copper	0.10	Classroom 1	DW005	P1
LF88872	Copper	0.09	Classroom 1	DW005	P2
LF88873	Copper	0.09	Classroom 1	DW005	F01
LF88874	Copper	0.06	Classroom 1	DW005	F02
LF89553	Copper	0.45	Rainbow Pre K	CF030	CA1
LF89554	Copper	0.37	Rainbow Pre K	CF030	CA2
LF89555	Copper	0.22	Rainbow Pre K	CF030	CA3
LF89556	Copper	0.22	Rainbow Pre K	CF030	CA4
LF89557	Copper	0.21	Rainbow Pre K	CF030	CA5
LF89558	Copper	0.21	Rainbow Pre K	CF030	CA6
LF89559	Copper	0.20	Rainbow Pre K	CF030	CA7
LF89560	Copper	0.20	Rainbow Pre K	CF030	CA8
LF89561	Copper	0.20	Rainbow Pre K	CF030	CA9
LF89562	Copper	0.20	Rainbow Pre K	CF030	CA10
LF89563	Copper	0.40	Classroom 11	CF015	CB1
LF89564	Copper	0.14	Classroom 11	CF015	CB2
LF89565	Copper	0.13	Classroom 11	CF015	CB3
LF89566	Copper	0.13	Classroom 11	CF015	CB4
LF89567	Copper	0.13	Classroom 11	CF015	CB5
LF89568	Copper	0.13	Classroom 11	CF015	CB6
LF89569	Copper	0.13	Classroom 11	CF015	CB7
LF89570	Copper	0.12	Classroom 11	CF015	CB8
LF89571	Copper	0.12	Classroom 11	CF015	CB9
LF89572	Copper	0.12	Classroom 11	CF015	CB10
LF89573	Copper	0.16	Classroom 21	CF027	CC1
LF89574	Copper	0.14	Classroom 21	CF027	CC2
LF89575	Copper	0.14	Classroom 21	CF027	CC3
LF89576	Copper	0.14	Classroom 21	CF027	CC4
LF89577	Copper	0.14	Classroom 21	CF027	CC5
LF89578	Copper	0.15	Classroom 21	CF027	CC6
LF89579	Copper	0.15	Classroom 21	CF027	CC7
LF89580	Copper	0.15	Classroom 21	CF027	CC8
LF89581	Copper	0.15	Classroom 21	CF027	CC9
LF89582	Copper	0.15	Classroom 21	CF027	CC10
Note: Results of "Not Detected" have been converted to a numerical value of zero to allow for ease of					
None of the results for Copper exceeded 1.3 PPM					

[illegible]

[illegible]

Flush Sample taken 2 minutes after First Flush Sample
First Primary draw of 125 milliliters
Second Primary draw of 125 milliliters
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Primary draw of 125 milliliters
Second Primary draw of 125 milliliters
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Primary draw of 125 milliliters
Second Primary draw of 125 milliliters
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Primary draw of 125 milliliters
Second Primary draw of 125 milliliters
Flush Sample taken 30 Seconds after Second Primary Draw
Flush Sample taken 2 minutes after First Flush Sample
First Sequential Sample
Second Sequential Sample
Third Sequential Sample
Forth Sequential Sample
Fifth Sequential Sample
Sixth Sequential Sample
Seventh Sequential Sample
Eigth Sequential Sample
Ninth Sequential Sample
Tenth Sequential Sample
First Sequential Sample
Second Sequential Sample
Third Sequential Sample
Forth Sequential Sample
Fifth Sequential Sample
Sixth Sequential Sample
Seventh Sequential Sample
Eigth Sequential Sample
Ninth Sequential Sample
Tenth Sequential Sample
First Sequential Sample
Second Sequential Sample
Third Sequential Sample
Forth Sequential Sample
Fifth Sequential Sample
Sixth Sequential Sample
Seventh Sequential Sample
Eigth Sequential Sample
Ninth Sequential Sample
Tenth Sequential Sample

Rennaker, Joanne (DEQ)

From: Feuerstein, Heather (DEQ)
Sent: Thursday, October 29, 2015 12:03 PM
To: Krisztian, George (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Tommasulo, Karen (DEQ); Wurfel, Brad (DEQ)
Subject: Freeman Elementary Report
Attachments: Freeman Elementary Report.pdf

Steve asked that I add the address to the school. I have done so on the attached version. I also added page numbers.

Heather Feuerstein
Management Assistant to
Maggie Pallone, Deputy Director and
Brad Wurfel, Communications Director
Department of Environmental Quality
517.284.6715

Freeman Elementary School

4001 Ogema St. Flint MI 48507

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.

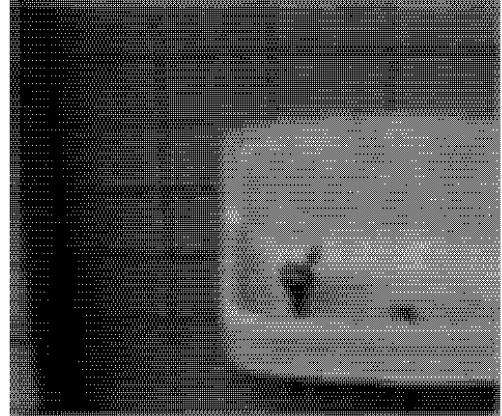
Outlets With Lead Levels Greater Than 15 Parts per Billion

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

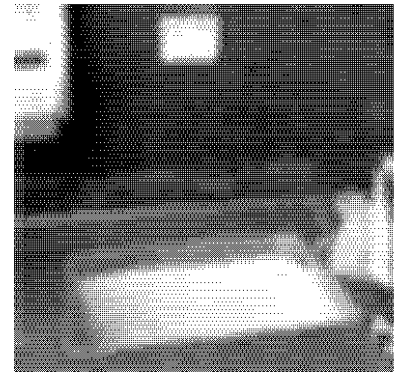
These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself. The make and model of this fixture is unknown but appears to be made of chrome plated brass and may be connected on the underside of the sink using a brass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

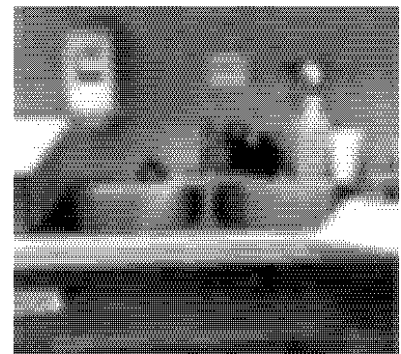
These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself and its connecting plumbing. The make and model of this fixture is unknown but appears to be made of chrome plated brass and may be connected on the underside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

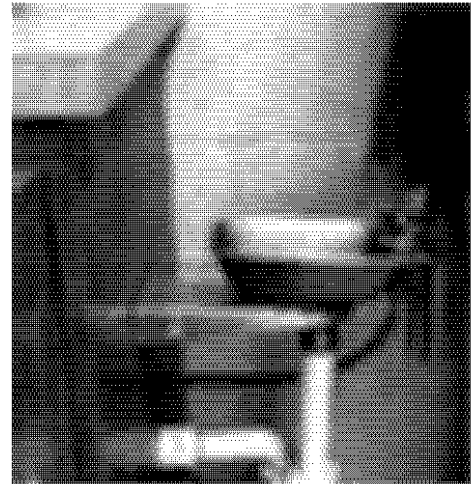
These results suggest the highest contribution of lead may be from the bubbler itself. This bubbler fixture appears to be made of chrome plated brass. This style bubbler typically has a 4-5 inch brass fitting that connects to a 3 inch brass nipple on the underside of the sink. This would explain the 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)

From: Krisztian, George (DEQ)
Sent: Wednesday, November 04, 2015 9:47 AM
To: Busch, Stephen (DEQ)
Cc: Shekter Smith, Liane (DEQ); Feuerstein, Heather (DEQ)
Subject: Freeman Elementary Sequential Samples

Importance: High

Hi Steve,

I am hoping to get the Freeman Elementary Sequential Sample Data late this morning or early this afternoon. I will get that information to you ASAP so that it can be incorporated into the evaluation document that you put together. We will need to get this together as quickly as we can.

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) 420-5897

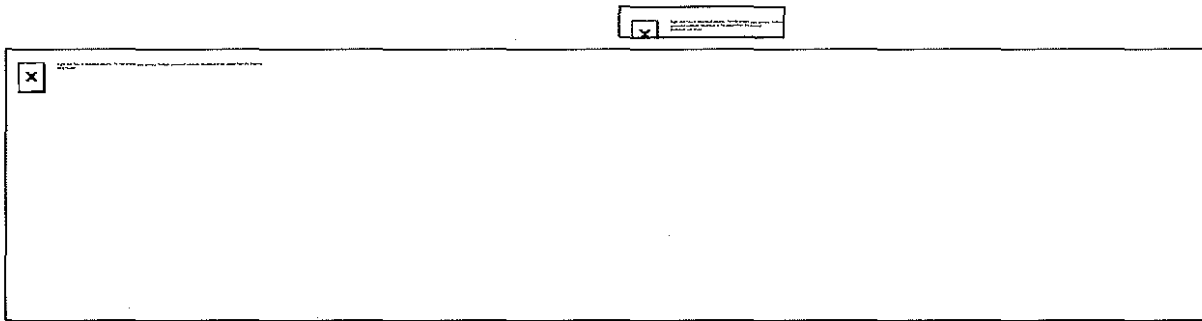
Rennaker, Joanne (DEQ)

From: Thelen, Mary Beth (DEQ)
Sent: Thursday, October 01, 2015 5:48 PM
To: Busch, Stephen (DEQ); Benzie, Richard (DEQ); Krisztian, George (DEQ); Sygo, Jim (DEQ); Pallone, Maggie (DEQ)
Cc: Devereaux, Tracy Jo (DEQ); Shekter Smith, Liane (DEQ); Shaler, Karen (DEQ); Feuerstein, Heather (DEQ); Thelen, Mary Beth (DEQ)
Subject: FW: [DEQ] Michigan leaders to announce action plan for Flint drinking water

For Friday.

From: Michigan Department of Environmental Quality [mailto:MIDEQ@govsubscriptions.michigan.gov]
Sent: Thursday, October 01, 2015 5:22 PM
To: Thelen, Mary Beth (DEQ)
Subject: [DEQ] Michigan leaders to announce action plan for Flint drinking water

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Oct. 1, 2015

Michigan leaders to announce action plan for Flint drinking water

Friday, Oct. 2 at 1:30 p.m.

Local, state and federal leaders will host a press conference to announce a comprehensive action plan for addressing drinking water concerns in Flint. Participants will include:

- Harvey Hollins, Director of the Office of Urban Initiatives for Gov. Rick Snyder
- Dan Wyant, Director for the Michigan Department of Environmental Quality
- Nick Lyon, Director for the Michigan Department of Health and Human Services
- Dr. Eden Wells, Chief Medical Executive for the Michigan Department of Health and Human Services
- Dayne Walling, Mayor of Flint
- Other local, state and federal officials

Location:

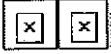
Kettering University, Innovation Center
 1300 Bluff St.
 Flint, MI 48504

This is a media event open to credentialed news media only. Media who plan to attend this event should RSVP by noon Friday. Contact Rosemarie Olszewski at 517-284-6700 or olszewskir@michigan.gov.



Questions?
[Contact Us](#)
Ph: 800-662-9278

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This email was sent to thelenm2@michigan.gov using GovDelivery, on behalf of: Michigan Department of Environmental Quality · Constitution Hall · 525 West Allegan Street · PO Box 30473 · Lansing, MI 48909 · 800-662-9278

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <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>
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
 TO: 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

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

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, August 19, 2014 8:34 AM
To: Rosenthal, Adam (DEQ); Busch, Stephen (DEQ)
Subject: FW:
Attachments: Boil Water Advisory Event Timeline.docx

Here's a good summary of Flint's bacti & CL2 results since last Tues for quick reference....can we get this printed in color??

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, August 19, 2014 8:07 AM
To: Prysby, Mike (DEQ)
Cc: Brent Wright; Daugherty Johnson
Subject:

Mike,

Good morning, Here is a list of sampling and results that have taken place over the last week. I think you got most of this over the phone in the last couple days, but I wanted to organize it for all of us.

Mike Glasgow

City of Flint Boil Water Advisory Event Timeline

August 12th – Routine distribution sampling yielded 3 samples positive for coliform bacteria.

Sample Site	Address	Free Chlorine	Total Chlorine
# 4	3606 Corunna Rd.	0.1	0.2
# 5	2501 Flushing Rd	0.1	0.1
C.S.	1100 Cedar St.	0.0	0.1

August 13th – Distribution repeat sampling along with upstream and downstream locations yielded 8 samples positive for coliform bacteria (all but C.S. Downstream), with one sample positive for E. coli (# 4 Downstream).

Sample Site	Address	Free Chlorine	Total Chlorine
# 4	3606 Corunna Rd.	0.0	0.1
# 4 Upstream	3521 Corunna Rd.	0.0	0.1
# 4 Downstream	3614 Corunna Rd.	0.0	0.1
# 5	2501 Flushing Rd.	0.0	0.1
# 5 Upstream	N. Chevrolet	0.0	0.1
# 5 Downstream	2740 Flushing Rd.	0.0	0.1
C.S.	1100 Cedar St.	0.0	0.1
C.S. Upstream	1035 Ann Arbor St.	0.0	0.0
C.S. Downstream	702 W. 12th St.	0.7	1.1

August 14th – Notified DEQ of test results from August 13th sampling. Resampled all 9 locations. Sampling yielded one sample positive for coliform bacteria at Site # 5.

Sample Site	Address	Free Chlorine	Total Chlorine
# 4	3606 Corunna Rd.	0.2	0.4
# 4 Upstream	3521 Corunna Rd.	0.4	0.7
# 4 Downstream	3614 Corunna Rd.	0.4	0.7
# 5	2501 Flushing Rd.	0.0	0.1
# 5 Upstream	N. Chevrolet	0.0	0.1
# 5 Downstream	2740 Flushing Rd.	0.1	0.3
C.S.	1100 Cedar St.	0.6	0.9
C.S. Upstream	1035 Ann Arbor St.	0.0	0.1
C.S. Downstream	702 W. 12th St.	0.0	0.1

August 15th – Resampled Site # 5 along with upstream & downstream locations. Site # 5 and upstream locations were positive for coliform bacteria. DEQ requires boil water notice to be issued tonight.

Sample Site	Address	Free Chlorine	Total Chlorine
# 5	2501 Flushing Rd	0.3	0.5
# 5 Upstream	1117 N. Chevrolet	0.0	0.1
# 5 Downstream	2740 Flushing Rd.	0.1	0.3

August 16th – Sampled 5 sites in boil water notice area, and Site # 5 along with upstream & downstream locations. 1 site (Burger King) in the boil water area tested positive for total coliform bacteria. Site # 5 upstream location was also positive for total coliform bacteria.

Sample Site	Address	Free Chlorine	Total Chlorine
# 4	3606 Corunna Rd.	0.2	0.4
# 4 Upstream	3521 Corunna Rd.	0.3	0.5
YaYa's (DS)	3709 Corunna Rd.	0.2	0.3
Sandi's Catering (UP)	1001 Ballenger Hwy.	0.1	0.2
Burger King (UP)	1006 Ballenger Hwy.	0.1	0.3
# 5	2501 Flushing Rd.	0.1	0.2
# 5 Upstream	1117 N. Chevrolet	0.1	0.2
# 5 Downstream	Ballenger Hwy.	0.2	0.4

August 17th – Sampled six sites in the boil water notice area 24 hours after the first set. Also sampled Site # 5 upstream location. The Burger King sample was positive for total coliforms.

Sample Site	Address	Free Chlorine	Total Chlorine
# 4	3606 Corunna Rd.	0.2	0.4
# 4 Upstream	3521 Corunna Rd.	0.3	0.6
YaYa's (DS)	3709 Corunna Rd.	0.1	0.3
Sandi's Catering (UP)	1001 Ballenger Hwy.	0.1	0.3
Burger King (UP)	1006 Ballenger Hwy.	0.1	0.3
Hungry Howie's (DS)	3625 Corunna Rd.	0.1	0.4
# 5 Upstream	1117 N. Chevrolet	0.1	0.3

August 18th – Sampled 7 sites in the boil water notice area. Samples were also collected at site # 5 along with upstream and downstream locations.

Sample Site	Address	Free Chlorine	Total Chlorine
# 4	3606 Corunna Rd.	0.2	0.4
# 4 Upstream	3521 Corunna Rd.	0.3	0.5
# 4 Downstream	3614 Corunna Rd.	0.2	0.3
YaYa's (DS)	3709 Corunna Rd.	0.1	0.3
Abbotts Meat (UP)	3623 Blackington	0.1	0.2
Burger King (UP)	1006 Ballenger Hwy.	0.1	0.2
Hungry Howie's (DS)	3625 Corunna Rd.	0.1	0.3
# 5	2501 Flushing Rd.	0.3	0.5
# 5 Upstream	1117 N. Chevrolet	0.1	0.2
# 5 Downstream	1274 Ballenger Hwy.	0.2	0.5

First seven results available @ 3:20pm, the rest @ 5:20pm

Rennaker, Joanne (DEQ)

From: Shekter Smith, Liane (DEQ)
Sent: Friday, October 16, 2015 11:46 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Benzie, Richard (DEQ)
Subject: FW: 3rd Quarter Water Report

From: Krisztian, George (DEQ)
Sent: Friday, October 16, 2015 6:54 AM
To: Sygo, Jim (DEQ); Wyant, Dan (DEQ); Wurfel, Brad (DEQ); Shekter Smith, Liane (DEQ)
Cc: Thelen, Mary Beth (DEQ); Shaler, Karen (DEQ)
Subject: FW: 3rd Quarter Water Report

FYI

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: Marc Edwards [<mailto:edwardsm@vt.edu>]
Sent: Thursday, October 15, 2015 7:29 PM
To: 'Howard Croft'; 'Laura Sullivan'
Cc: 'Gerald (Jed) Natzke'; 'Andy Leavitt'; 'Amy Hovey'; 'Brent Wright'; 'Lytle, Darren'; 'Flint Mayor'; 'donna.cole'; Dykema, Linda D. (DHHS); Krisztian, George (DEQ); 'Henry, James'; 'James Gaskin'; 'Jason Lorenz'; 'jmikewright'; 'JoAnne Herman'; 'John O'Brien'; 'Kirk Smith'; larry.koehler@mcc.edu; 'Lawrence Reynolds'; 'Lawrence Reynolds'; 'Michael Glasgow'; 'Wright, Michael'; 'Lane, Mike'; Prysby, Mike (DEQ); 'Natasha Henderson'; 'Norb Birchmeier'; 'Pete Levine'; 'Robert Bincsik'; rosejo@msu.edu; 'Russell Hudson'; 'Samir Matta'; schock.michael@epa.gov; 'Sean Kammer'; Busch, Stephen (DEQ); 'Warren Green'; Wurfel, Brad (DEQ); 'Anthony Chubb'; 'Kevin Keane'
Subject: RE: 3rd Quarter Water Report

I have gotten a lot of questions about this., so figured I would answer in one e-mail.

The city is still using the MDEQ sampling approach. That method takes the EPA sampling method, and adds two modifications, both of which are technically legal, but "miss" lead in water that is normally present when people use it. I have been trying to get these modifications banned since 2007, because they give a false low measurement of lead in water risks on the day you sample. As a result, a city can be meeting the EPA rule, technically, and still have a huge problem with elevated blood lead in children.

The two modifications are:

1) **Using a sample bottle with a tiny opening.** This forces consumers to fill the bottles at a very low flow rate. The net effect of this, is that particulate Pb that would normally flow into a consumers water glass at a normal flow rate, stays on the pipe when you sample for lead. When a consumer fills a glass or collects water for drinking, the particles fall off.

2) **Pre-cleaning the pipes the night before sampling (aka. Pre-flush).** This basically remediates and sweeps the pipe clean of lead the night before sampling, so that the next morning when you sample, you get unusually low lead. The sampling protocol used by MDEQ requires a **5 minute pre-cleaning.**

When Virginia Tech sampled in Flint, we used the EPA protocol, without the modifications that miss lead in water problems.

I hope this explains the discrepancy. The MDEQ approach could give people a result for 0 ppb lead in water, and when they collect a sample for cooking or drinking it can be 100 ppb. I have seen it happen. **No one who is getting a low result using the MDEQ approach, should be told their water is safe to drink.** The result is meaningless. If it is high with the MDEQ approach, you have a very, very serious problem. MDEQ is also not the only primacy agency in the country using these methods that miss lead, so **I am not blaming anyone, I am just stating the facts.**

Miguel Del Toral of EPA warned MDEQ to stop using this method back in April-May in writing, because it would hide a lead problem if they existed, and they basically told him to mind his own business. I also asserted that Miguel was right, in the ACLU report in June. <http://www.deadlinedetroit.com/articles/12697/scary-leaded-water-and-one-flint-family-s-toxic-nightmare#.ViA1Zn7nviU>

Best Regards, Marc

Rennaker, Joanne (DEQ)

From: Shekter Smith, Liane (DEQ)
Sent: Thursday, October 15, 2015 10:36 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Rosenthal, Adam (DEQ)
Cc: Benzie, Richard (DEQ); Cook, Pat (DEQ)
Subject: FW: 3rd Quarter Water Report
Attachments: 3rd Quarter Water Quality Report (2).docx

FYI

From: Krisztian, George (DEQ)
Sent: Monday, October 12, 2015 7:44 AM
To: Wyant, Dan (DEQ); Sygo, Jim (DEQ); Thelen, Mary Beth (DEQ); Shaler, Karen (DEQ); Wurfel, Brad (DEQ); Pallone, Maggie (DEQ); Tommasulo, Karen (DEQ); Shekter Smith, Liane (DEQ)
Subject: FW: 3rd Quarter Water Report

Here is the latest version of Flint's Water Quality Report incorporating comments from TAC members.

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: Howard Croft [<mailto:hcroft@cityofflint.com>]
Sent: Sunday, October 11, 2015 7:29 AM
To: Andy Leavitt
Cc: Marc Edwards; Amy Hovey; Brent Wright; Darren Lytle; Dayne Walling; donna. cole; Dykema, Linda D. (DHHS); Krisztian, George (DEQ); Gerald (Jed) Natzke; James Henry; Jamie Gaskin; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; 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; Russell Hudson; Samir Matta; schock.michael@epa.gov; Sean Kammer; Busch, Stephen (DEQ); Warren Green; Wurfel, Brad (DEQ); Anthony Chubb; Kevin Keane
Subject: Re: 3rd Quarter Water Report

All,

The comments were very helpful and I have made several revisions to the report that was sent yesterday, please review the amendments and forward any additional recommendations. I would like to solicit comments from anyone in the medical community that is willing to be quoted.

On Sat, Oct 10, 2015 at 12:03 PM, Andy Leavitt <aleavitt@senatedems.org> wrote:
 I would echo Marc's sentiment on the bold language agreeing with his points but I would also add that trust needs to be rebuilt and the public simply will not believe anything in the document if you start by

telling them it still meets standards. They do not differentiate between regs and rules but they know the water does not meet the standard of the physician community.

I would also recommend opening with timeline of going back to Detroit and what steps people can take to mitigate lead issues. Preferably with an excerpt from a physician.

The technical information matters for transparency but the trust gap is so wide that most people will be skeptical of all of it.

On Sat, Oct 10, 2015 at 11:48 AM Marc Edwards <edwardsm@vt.edu> wrote:

Hi Howard,

I think it is universally acknowledged now, that 30 seconds to 2 minutes flushing are not adequate, and **all public education should say 5 minutes flushing.**

I also think that given results of our team sampling 277 homes, the high levels of lead MDEQ detected in the Flint schools (a 90%ile over 15 ppb..which is horrible because they are not tier 1 plumbing sites), and the problems in the official LCR sampling conducted in late 2014-2015, that the following statement (in bold) is not really helpful in getting the message out about the current health risks. The bold statement seems more like wishful thinking or a legal position, and detracts from the goal of telling the public about the known problems.

After 16 months of treating water from the Flint River, the City became aware that the while still meeting all Safe Drinking Water Standards, the level of corrosiveness could result in more lead leaching from service lines and household plumbing.

That is my input. I am available at 540 231-7236 or 540 320-8740, if anyone should have questions about this.

Best Regards,

Marc Edwards

From: Howard Croft [mailto:hcroft@cityofflint.com]

Sent: Saturday, October 10, 2015 8:33 AM

To: Amy Hovey; Andy Leavitt; Brent Wright; Darren Lytle; Dayne Walling; donna. cole; dykemal; edwardsm; George Krisztian (DEQ); Gerald (Jed) Natzke; Howard Croft; James Henry; Jamie Gaskin; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; larry.koehler@mcc.edu; Laura Sullivan; Lawrence Reynolds; Lawrence Reynolds; Michael Glasgow; Michael Wright; Mike Lane; Mike Prysby (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Bincsik; rosejo@msu.edu; Russell Hudson; Samir Matta; schock.michael@epa.gov; Sean Kammer; Stephen Busch (DEQ); Warren Green; Wurfel, Brad (DEQ); Anthony Chubb; Kevin Keane

Subject: 3rd Quarter Water Report

Team,

Included in this email is a copy of the first quarter water quality report that has been developed by the Utilities Division. Please take a look and offer any comments that you may have regarding content. There will be an additional one page insert containing three months test data inserted prior to distribution.

The purpose of the quarterly mailer is to increase communication, provide more transparency, and put more information into the hands of the public about what's occurring within the water system and with the infrastructure.

I will be putting together a separate weekly report for 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

--

Howard Croft

Public Works Director

City of Flint

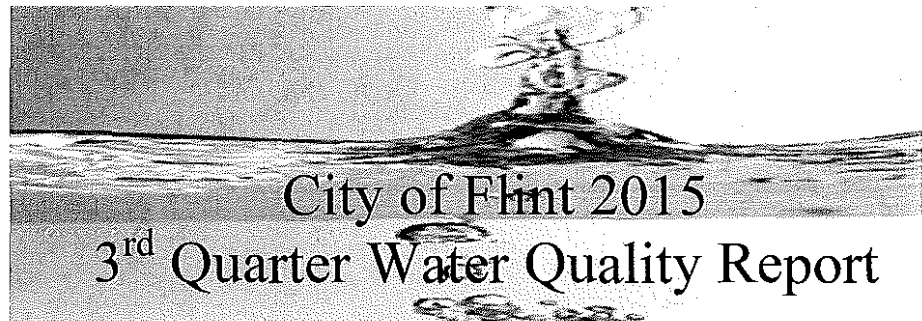
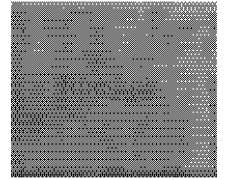
1101 S. Saginaw Street

Flint, MI 48502

PH# 810.766.7135 Ext.2043

hcroft@cityofflint.com

Customer Service Center
City Hall
1101 S. Saginaw St.
Flint, MI 48501



The Quarterly Water Quality Report provides important information about your drinking water. This report includes information about the water source, current drinking water issues, lead information, water filters, 3rd quarter work accomplished, and a water timeline of events. The City of Flint Department of Utilities is dedicated to providing quality drinking water to the residents of the community. The Flint Water Plant operates and maintains a certified drinking water laboratory to assure compliance with all state and federal regulations, and is committed to prompt and thorough notification to the consumers if there is any reason for concern about the quality of the drinking water. Information about your drinking water is available on the City of Flint web page at www.cityofflint.com or by calling the City of Flint Water Plant at (810) 787-6537. The Safe Drinking Water Hotline at (800) 426-4791 is a resource for health related questions and water quality issues. General drinking water information can also be found on the U.S. Environmental Protection Agency (EPA) web site at www.epa.gov/safewater/.

Water Source

The City of Flint began using the Flint River as a water source in May of 2014. After 16 months of treating water from the Flint River, the City became aware that the level of corrosiveness could result in more lead leaching from service lines and household plumbing. Reports of elevated blood lead levels resulted in the City's Technical Advisory Committee making a recommendation to return to the previous source of water while waiting for the KWA to provide water from Lake Huron.

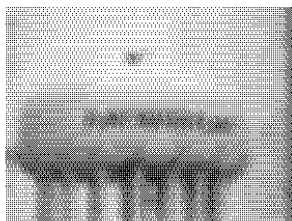
On Wednesday October 8, 2015, with the consent of Governor Snyder, the City stated they plan to return to its previous source of water. The decision followed two consecutive lead and copper test periods that exceeded 5ug/L which calls for additional action. In August of 2015 following the guidance of the DEQ, the City began also developing additional corrosion control measures that will be evaluated if it is needed as an additive to treated water but will be required when the city begins treating raw water from the Karegnondi Water Authority.

The City contributed \$2 Million dollars, the Mott Foundation contributed \$4 Million dollars, and the State of Michigan contributed \$ 6 Million dollars to make the transition possible. The City expects the transition to occur in October.

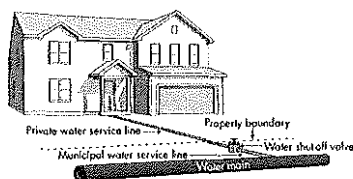
Current Drinking Water Issues & Lead Information

As noted, there has been a heightened awareness of lead leaching into drinking water through service lines and household plumbing. The City's Technical Advisory Committee has enlisted the support of EPA lead experts and is working with State of Michigan representatives to increase testing, rebuild public confidence, and implement long-term solutions to lead. It is recommended that everyone get their water tested and check with a plumber to evaluate the type and condition of your household plumbing. The City is currently mapping all of its lead service lines and working to develop a program to get lines changed over time.

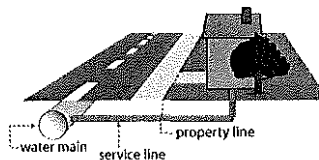
If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 5 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at <http://www.epa.gov/safewater/lead>.



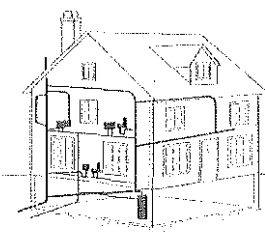
**No lead in water
leaving the
Treatment Plant.**



**Little or no lead in
water in the
transmission mains.**



**Lead can leach into
water through
service lines.**



**Lead can leach into
water through
household plumbing.**

Water Filters

Free water filters have been made available to current Flint residents at several locations. The MDHHS and the Genesee County Community Action Resource Department (GCCARD) are providing Free National Sanitation Foundation certified water filters at the following locations.

Residents receiving MDHHS assistance are encouraged to visit either the **125 E. Union St.** or **4809 Clio Rd.** MDHHS office location to obtain a free, certified home water filter. Residents who are not currently enrolled in MDHHS assistance programs should visit the (GCCARD) offices located at **2727 Lippincott** and **601 N. Saginaw** in Flint.

Staff will be onsite 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.

3rd Quarter Work Accomplished

- Successfully completed the installation of Granulated Activated Carbon at the water treatment plant which reduced the TTHM level in the water and helped bring the City back into compliance with the Safe Drinking Water Act.
- Over 3000 new water meters were installed creating better accuracy, accountability, and decreasing the number of estimated reads on water & sewer bills.
- Evaluated over 8000 valves in the system and identified over 2300 that are currently inoperable. The repair of these valves will be budgeted and worked into our multi-year Capital Improvement Plan.
- Leak Detection on all 600 miles of the distribution system has started and is over halfway complete. Several dozen leaks have been identified and repairs continue as more leaks are found. This has decreased the amount of water loss existing in the system.
- Construction of a load out facility at our wastewater plant is on target for completion by November and will allow the City to eliminate the use of the incinerator resulting in significant annual savings.
- Hundreds of main breaks are repaired annually by City workers on top of construction projects and routine maintenance.



employees work to contain and repair one of many main breaks that continues to occur as a part of an antiquated infrastructure system.

Hundreds of water main breaks occur annually and the City's skilled workforce is constantly faced with long hours and changing weather conditions in which they work. Hydrant flushing and hydrant winterization are also part of the system maintenance and often cause water discoloration. It is advised that you run your water for several minutes to allow discoloration to

pass if work is being done in your area. The City is working to increase notification to residents when and where work is occurring.

Water Timeline

The following is a timeline of events, beginning with signing the KWA contract leading up to the current status of switching back to our previous source of water. This timeline only highlights certain notable events, for more information please visit the "water" page on the City of Flint website or email flintwater@cityofflint.com with your questions or to request a water test.

2013		
Date	Event	Comments
16-Apr	Flint signs contract with Karegnondi Water Authority (KWA).	Switch to KWA projected to provide water by mid-2016 and to result in over \$200 million dollars in savings over time.
17-Apr	DWSD terminates existing water contract.	Termination effective 12 months from date of the notice.
Oct	Determination is made to use Flint River for interim period if construction can be completed.	Determination follows attempt at signing new contract with DWSD and evaluation of River option.
2014		
9-Apr	Flint receives permit for use of the Flint River.	Permit is approved for interim use of Flint River which is expected to be just over two years.
30-Apr	Flint closes off the supply of water from DWSD	Valves were closed in the evening and monitored by Flint, GCDC, and DWSD.
Jul - Sept	Multiple boil water notices are issued in several areas of the City	Notices are due to test samples showing that bacteria growth is possible. Hydrant flushing is unable to clear the environment and additional chlorine is introduced.
Nov	Development of Operational Evaluation Report (OER)	Recognition of high TTHM levels prompts a preemptive development of an OER which was submitted to the DEQ
16-Dec	Flint receives TTHM violation notice from DEQ	Violation is calculated from a running average of four quarterly test results
2015		
2-Feb	Flint offers free water testing	Letters are sent to residents who have voiced water concerns and free testing is expanded to all residents
10-Feb	Veolia Consultants hired	Veolia responds to RFP for a water expert to make recommendations to reduce TTHM levels.
4-Mar	Flint holds first Technical Advisory Committee meeting	Formation of Advisory Committee comes out of Veolia recommendation and helped bring experts together to discuss options and solutions.
20-May	Flint holds second Technical Advisory Committee meeting	meeting is used to confirm that Flint plans to install the recommended Granulated Activated Carbon filters by August to combat TTHM
Aug	GAC filter installation complete	Filter installation completed on schedule and the TTHM drops significantly prior to quarterly testing
17-Aug	DEQ directs City to begin additional corrosion control	Corrosion control design moves forward with the City's engineering firm.
2-Sep	Flint receives notice they have returned to compliance	DEQ sends notification that Flint is no longer in violation of the Safe Drinking water act.
2-Sep	Online report that Flint River water is very corrosive	Report is by a VA Tech research group led by Professor Marc Edwards after hundreds of samples were tested.
24-Sep	Medical Professionals report a rise in elevated blood lead level of children.	A group of Medical Professionals led by Dr. Mona Hanna-Attisha, announce the difference in blood lead levels
25-Sep	Flint issues a "Lead Advisory"	Following the medical information, Flint and the Genesee County Health Department issue a "Lead Advisory"
1-Oct	Public Health State of Emergency	County Commissioners and the Health Department declare a Health Emergency.
7-Oct	Flint Technical Advisory Committee recommends returning to former source of water	The Tech team includes EPA lead experts, Marc Edwards, DEQ representatives, engineering team, Medical Professionals, and City Officials.
8-Oct	Governor announces effort to return Flint to former water source	The City of Flint, Mott Foundation, and State of Michigan combine to raise funding for switch.

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, January 27, 2015 2:38 PM
To: Wurfel, Brad (DEQ)
Cc: Busch, Stephen (DEQ); Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ)
Subject: FW: ABC12 News Flint water test results comment?

Brad,

The reporter from ABC12 has provided me the answers to the questions I asked pertaining to the TTHM samples he collected (however...not the actual results) ...Before the results are provided to us, Larry wants us to agree not to release the results till their embargo time...this coming Friday....can we guarantee that? Besides that, I am comfortable in assisting you with the preparation of our comments back to ABC12.

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

From: Elliott, Larry F. [<mailto:larry.f.elliott@abc12.com>]
Sent: Tuesday, January 27, 2015 2:01 PM
To: Prysby, Mike (DEQ)
Subject: RE: ABC12 News Flint water test results comment?

Mike..
 In answer to your questions below:

1. Our sampling was done at 4 locations within the Flint city water system on Tuesday, January 20th, between 10:40am for our first location and 3:40 pm for our last location. They were not the same sites used for Flint's stage 2 DDBP monitoring.

2. I collected the samples after receiving instruction from our the independent certified testing lab we used. City certified operators did not collect or oversee the collection of our samples.

3. Sampling protocol: Run tap for 1-2 minutes.
 Samples were collected in a 40 ml VOA vial with sodium thiosulfate as a dechlorinating agent. Samples were collected with zero head space. VOC's used 40 ml VOA with ascorbic acid then adding hydrochloric acid with zero head space. All other tests were MDPE containers except bacteria samples were in specific BACTI containers.

4. Lab used was Water Tech in Howell, ID#0023

5. Method used is EPA524.2 (see above for sampling unit) or as specified on the report.

Please let me know if you can comment on our results. I would only provide them to you with the agreement that keep them completely confidential and not release them to anyone before our embargo time of Friday, January 30th at 7 AM.

Larry

From: Prysby, Mike (DEQ) [<mailto:PRYSBYM@michigan.gov>]

Sent: Tuesday, January 27, 2015 10:00 AM

To: Elliott, Larry F.

Cc: Busch, Stephen (DEQ); Benzie, Richard (DEQ); Wurfel, Brad (DEQ); Shekter Smith, Liane (DEQ); Rosenthal, Adam (DEQ)

Subject: RE: ABC12 News Flint water test results comment?

Larry,

We are willing to review the TTHM results of all samples collected within the Flint water system for a limited assessment of the data. Please include the following information with the sample results:

1. Sampling location /time – was Flint's Stage 2 DDBP monitoring plan sites used?
2. Who collected the samples? Did city certified operators collect the samples or oversee the sample collection?
3. Sampling protocol (method)
4. Certified lab used
5. Lab method used & proper sampling unit

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

From: Elliott, Larry F. [<mailto:larry.f.elliott@abc12.com>]

Sent: Tuesday, January 27, 2015 7:48 AM

To: Prysby, Mike (DEQ)

Subject: ABC12 News Flint water test results comment?

Mike,

We have just completed our own independent testing of multiple sites within the Flint water system and wonder if you'd be willing to look them over and give us your professional opinion.

I could email you the reports from the testing lab we used.

Larry Elliott

ABC12 News

(810)257-2805 office

(810)877-5378 cell

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, January 27, 2015 8:55 AM
To: Busch, Stephen (DEQ); Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ)
Subject: FW: ABC12 News Flint water test results comment?

I am in the position to look at these results; however, the validity of the samples may be questionable given they were most likely not collected by Flint operators or in accordance to Flint's Stage 2 DDBP plan. Any professional opinion may need to be carefully worded....

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

From: Elliott, Larry F. [<mailto:larry.f.elliott@abc12.com>]
Sent: Tuesday, January 27, 2015 7:48 AM
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Larry Elliott
ABC12 News
(810)257-2805 office
(810)877-5378 cell

Rennaker, Joanne (DEQ)

From: Rosenthal, Adam (DEQ)
Sent: Thursday, May 15, 2014 9:18 AM
To: Busch, Stephen (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: FW: April '14 MOR
Attachments: 4-14 State Report.xls

thought he CC'd you.

Adam

From: Michael Glasgow [<mailto:mglasgow@cityofflint.com>]
Sent: Wednesday, May 14, 2014 2:33 PM
To: Rosenthal, Adam (DEQ)
Subject: Re: April '14 MOR

Adam,

Attached is a copy of our MOR. It is not complete. As you will see, it is only missing the information on plant flow. That data was in Brent's office, which was unfortunately flooded due to a replaced valve mishap. Flow coming out of the plant was shut of for a brief moment (valve was originally half open, and upon repair of the controller the valve was closed fully then re-opened) stopping flow to our pump station, and flooded the front offices with over 3 foot of water causing a lot of Brent's paper work to be saturated. He is still drying things out and separating them. I have forwarded your original message to him and I expect to have the completed version of our MOR to you by the end of the week. I am in the process of altering the MOR to reflect our new operation, however for last month considering the fact we only distributed water a couple days, I tried to combine them together. During those couple days we were also supplementing the distribution system with Detroit water located in our reservoirs.

Mike Glasgow
 City of Flint Water Plant

On Wed, May 14, 2014 at 8:52 AM, Rosenthal, Adam (DEQ) <ROSENTHALA@michigan.gov> wrote:

Morning Mike, reporters are calling and Steve is looking for the April '14 MOR, please email a copy when you get this.

Please note that since Flint submits the monthly bacti results with the MOR, it is due by the 10th of the month. Please make sure to send future MORs, or at least the bacti results so they are received by the 10th.

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



Coagulation Parameters

WSSN 2310

Apr-14

[illegible]



Flouridation & Chlorination

WSSN 2310

Apr-14

D A T E	Fluorid e Applied F- mg/l	Fluoride Analyses mg/l			Chlorine App. Mg/l			Chlorine Residual mg/l												
						Chlorine (prior to filtration) mg/L OCI-	Post Chlorin e mg/L	B&P	Sta II	Dort	3MG Well		Tap							
		Raw	Tap	Dist									Free	Free	Free	Free			Free	
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28						
1			0.59					0.8	0.9	0.9	0.9			0.9						
2			0.58					1.0	1.0	0.9	0.9			0.9						
3			0.63					0.8	1.1	1.0	0.9			0.9						
4			0.65					1.0	1.1	0.9	1.0			1.0						
5			0.66					1.0	1.1	1.1	1.0			1.1						
6			0.65					1.0	1.0	1.0	1.0			0.9						
7			0.71					n.s	n.s	n.s	n.s			1.0						
8			0.68					0.8	1.0	0.9	0.9			0.9						
9			0.64					1.0	1.0	0.9	0.9			0.8						
10			0.68					0.9	1.0	0.9	0.9			0.8						
11			0.64					1.0	1.2	1.0	1.0			1.0						
12			0.63					0.8	0.9	0.8	0.8			1.0						
13			0.67					0.9	1.0	0.9	0.8			0.9						
14			0.62					0.9	1.0	1.0	0.9			1.0						
15			0.54					0.9	1.1	1.0	n/a			1.0						
16			0.54					0.9	1.0	0.9	n/a			0.8						
17			0.59					0.8	1.1	0.9	n/a			0.9						
18			0.54					0.9	1.0	1.0	n/a			1.0						
19			0.57					0.8	1.0	0.9	n/a			1.0						
20			n/a					n.s	n.s	n.s	n/a			n.s						
21			0.61					0.9	1.0	0.9	n/a			1.0						
22			0.66					0.8	1.1	0.9	n/a			1.0						
23			0.61					0.8	1.0	0.9	n/a			0.8						
24			0.61					n.s	1.0	0.9	n/a			0.9						
25		0.14	0.59			3.5		n.s	n/a	n.s	1.7			0.8						
26		0.14	0.53			3.5		n.s	n/a	n.s	1.6			0.9						
27		0.13	0.53			3.6		n.s	n/a	n.s	1.5			1.0						
28		0.13	0.19			3.7		n.s	n/a	n.s	1.4			0.9						
29		0.15	0.58			3.7		n.s	n/a	n.s	1.5			0.9						
30		0.15	0.62			3.5		n.s	n/a	n.s	1.7			0.8						
AVG		0.14	0.60			3.6		0.9	1.0	0.9	1.1			0.9						
MAX		0.15	0.71			3.7		1.0	1.2	1.1	1.7			1.1						
MIN		0.13	0.19			3.5		0.8	0.9	0.8	0.8			0.8						

n.s. = no sample collected/tested



Chemical Analyses

WSSN 2310

Apr-14

D A T E	pH		Total Hard as CaCO ₃ mg/l		Total Alk as CaCO ₃ mg/l		NonCarbonate Hardness as CaCO ₃ mg/l				Calcium Ca ++ mg/l		Magnesium as Mg ++ mg/l		Chloride as Cl - mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1		7.57		98		74		24				30.5		5.3		
2		7.36		98		73		25				29.7		5.8		
3		7.33		98		74		24				30.5		5.3		
4		7.32		100		75		25				32.1		4.9		
5		7.44		100		76		24				30.5		5.8		
6		7.32		98		74		24				28.9		6.3		
7		7.41		100		73		27				31.3		5.3		
8		7.62		98		69		29				28.9		6.3		
9		7.46		98		72		26				29.7		5.8		
10		7.39		98		71		27				28.9		6.3		
11		7.34		100		75		25				31.3		5.3		
12		7.56		102		71		31				28.1		7.8		
13		7.37		96		64		32				28.9		5.8		
14		7.32		96		75		21				28.9		5.8		
15		7.46		98		73		25				28.9		6.3		
16		7.47		96		66		30				28.9		5.8		
17		7.32		96		71		25				29.7		5.3		
18		7.30		98		73		25				31.3		4.9		
19		7.28		100		72		28				28.9		6.8		
20		n.s		n.s		n.s		n.s				n.s		n.s		
21		7.34		98		74		24				29.7		5.8		
22		7.26		98		72		26				29.7		5.8		
23		7.25		98		71		27				29.7		5.8		
24		7.46		96		71		25				29.7		5.3		
25		7.39		96		75	0	21				29.7		5.3		
26	8.31	7.28	255	98	200	73	55	25			77.9	29.7	13.6	5.8	48	24
27	8.34	7.32	249	98	199	70	50	28			75.4	30.5	14.6	5.8	42	32
28	8.39	8.46	247	92	205	60	42	32			82.6	46.5	9.8	8.3	43	68
29	8.46	7.35	230	98	190	70	40	28			76.2	30.5	9.7	5.3		
30	8.41	7.30	248	98	208	73	40	25			72.1	29.7	17.5	5.8	45	17
AVG		7.42		98		72		26				30.4		5.9		
MAX		8.46		102		76		32				46.5		8.3		
MIN		7.25		92		60		21				28.1		4.9		

n.s. = no sample collected/tested



Bacteriological & Physical Parameters

WSSN 2310

Apr-14

D A T E	Total Coliform							Standard Plate Count		Wind Direction	Temp deg.C	Color		Odor	
	Plant Tap							Raw	Tap			Raw	Tap	Raw	Tap
	B&P	C.F.E.	Dort	3MG Well	C.S. #2	Lab Tap									
60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	
1	1/0		2/0	2/0	2/0	2/0					10.1				
2	1/0		2/0	2/0	2/0	2/0					10.1				
3	1/0		2/0	2/0	2/0	2/0					11.7				
4	1/0		2/0	2/0	2/0	2/0					11.7				
5	1/0		2/0	2/0	2/0	2/0					10.9				
6	1/0		2/0	2/0	2/0	2/0					10.7				
7	0/0		0/0	0/0	0/0	2/0					11.3				
8	1/0		2/0	2/0	2/0	2/0					9.9				
9	1/0		2/0	2/0	2/0	2/0					10.2				
10	1/0		2/0	2/0	2/0	2/0			< 2		8.8				
11	1/0		2/0	2/0	2/0	2/0					9.1				
12	1/0		2/0	2/0	2/0	2/0					10.1				
13	1/0		2/0	2/0	2/0	2/0					9.8				
14	1/0		2/0	2/0	2/0	2/0					9.9				
15	1/0		2/0	2/0	2/0	2/0					8.9				
16	1/0		2/0	2/0	2/0	2/0					10.6				
17	1/0		2/0	0/0	2/0	2/0					9.4				
18	1/0		1/0	0/0	1/0	2/0					9.2				
19	1/0		2/0	0/0	2/0	2/0					8.3				
20	0/0		0/0	0/0	0/0	0/0					n.s				
21	1/0		2/0	0/0	2/0	2/0					8.1				
22	1/0		2/0	0/0	2/0	2/0					7.7				
23	1/0		2/0	0/0	2/0	2/0					9.3				
24	1/0		2/0	2/0	2/0	2/0					8.7				
25	1/0	10/0	0/0	1/0	n/a	1/0			< 2		8.7				
26	1/0	12/0	0/0	1/0	n/a	1/0		> 1476	< 2		9.0				
27	1/0	12/0	0/0	1/0	n/a	1/0		142	< 2		8.8				
28	1/0	12/0	0/0	1/0	n/a	1/0		532	< 2		7.9				
29	1/0	4/0	0/0	1/0	n/a	1/0			< 2		8.5				
30	1/0	6/0	0/0	1/0	n/a	1/0		1246	< 2		10.3				
C.F.E. = Combined Filter Effluent											9.6				
											11.7				
											7.7				

n.s. = no sample collected/tested



Distribution System Monitoring

WSSN 2310

Apr-14

[illegible]



Distribution System Monitoring

WSSN 2310

Apr-14

[illegible]



ROUTINE POSITIVE DISTRIBUTION SAMPLES

Apr-14

Total number of positive routine samples:				Total Coliform: <u>0</u>		Fecal Coliform: <u>0</u>	
Date	Monitoring Station	Total Coliform	Fecal Coliform	Date	Retest of Station, Upstream & Downstream	Total Coliform	Fecal Coliform
Total number of routine distribution samples analyzed:				114			
Total number of routine distribution samples required:				100			

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, June 06, 2014 2:46 PM
To: Busch, Stephen (DEQ)
Subject: FW: April MOR
Attachments: 4-14 State MOR.xls

Steve,
fyp

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

From: Michael Glasgow [<mailto:mglasgow@cityofflint.com>]
Sent: Monday, June 02, 2014 1:59 PM
To: Prysby, Mike (DEQ)
Subject: April MOR

Mike here is a copy of the April MOR.

Mike Glasgow
City of Flint Water Plant

[illegible]

**Fluoridation &
Chlorination**

 City of Flint Water Treatment Plant
WSSN: 2310

April 2014

Page 3

Chemical Analyses

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)						Date	pH (S.U.)	
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap				
		Raw	Tap	Dist.							Free	Total	Free		Total	Free
1														1		
2														2		
3														3		
4														4		
5														5		
6														6		
7														7		
8														8		
9														9		
10														10		
11														11		
12														12		
13														13		
14														14		
15														15		
16														16		
17														17		
18														18		
19														19		
20														20		
21														21		
22														22		
23														23		
24														24		
25	0	0.14	0.59		3.5	0	3.5	1.8	2.1			0.8	1.0	25		7.39
26	0	0.14	0.53		3.5	0	3.5	1.7	1.9			0.9	1.1	26	8.31	7.28
27	0	0.13	0.53		3.6	0	3.6	1.7	1.9	1.5	1.8	1.0	1.1	27	8.34	7.32
28	0	0.13	0.19		3.7	0	3.7	1.7	1.9	1.4	1.8	0.9	1.0	28	8.39	8.46
29	0	0.15	0.58	0.43	3.7	0	3.7	n/a	n/a	n/a	n/a	0.9	1.1	29	8.46	7.35
30	0	0.15	0.62		3.5	0	3.5	1.7	2.0	1.5	1.8	1.0	1.1	30	8.41	7.30
Avg.	0	0.14	0.51	0.43	3.6	0	3.6	1.7	2.0	1.5	1.8	0.9	1.1	Avg.	8.38	7.52
Max.	0	0.15	0.62	0.43	3.7	0	3.7	1.8	2.1	1.5	1.8	1.0	1.1	Max.	8.46	8.46
Min.	0	0.13	0.19	0.43	3.5	0	3.5	1.7	1.9	1.4	1.8	0.8	1.0	Min.	8.31	7.28

[illegible]

**Bacteriological &
Physical Parameters**

 City of Flint Water Treatment Plant
WSSN: 2310

April 2014

Page 5

Date	Total Coliform						Standard Plate Count		Wind Direction	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap			Raw	Raw	Tap	Raw
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25	1		12	0	1	0		< 2		11.0				
26	1		12	0	1	0	> 1476	< 2		11.4				
27	1		12	0	1	0	142	< 2		11.1				
28	1		8	0	1	0	532	< 2		11.5				
29	1		0	0	1	0		< 2		12.1				
30	1		4	0	1	0	1246	< 2		13.5				
Avg.							n/a	< 2		11.8				
Max.							> 1476	< 2		13.5				
Min.							142	< 2		11.0				

**Distribution System
Monitoring**

 City of Flint Water Treatment Plant
WSSN: 2310

April 2014

Page 6

Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										Number of Samples
	1	2	3	4	5	6	7	8	CS	WR	
1											0
2											0
3											0
4											0
5											0
6											0
7											0
8											0
9											0
10											0
11											0
12											0
13											0
14											0
15											0
16											0
17											0
18											0
19											0
20											0
21											0
22											0
23											0
24											0
25											0
26											0
27											0
28											0
29	1.0	0.8	1.0	0.7	0.8	0.8	1.1	0.8	0.7	0.9	10
30											0
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	115
Total # of routine distribution samples required	100

Distribution Disinfectant Residual Summary	
Percent samples with a detectable disinfectant residual	100
Average disinfectant residual this month	0.9

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

[illegible]

[illegible]

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, June 06, 2014 2:46 PM
To: Busch, Stephen (DEQ)
Subject: FW: April MOR
Attachments: 4-14 State MOR.xls

Steve,
fyp

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

From: Michael Glasgow [<mailto:mglasgow@cityofflint.com>]
Sent: Monday, June 02, 2014 1:59 PM
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Mike here is a copy of the April MOR.

Mike Glasgow
City of Flint Water Plant

[illegible]

**Fluoridation &
Chlorination**

 City of Flint Water Treatment Plant
WSSN: 2310

April 2014

Page 3

Chemical Analyses

Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)						Date	pH (S.U.)	
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap				
		Raw	Tap	Dist							Free	Total	Free		Total	Free
1														1		
2														2		
3														3		
4														4		
5														5		
6														6		
7														7		
8														8		
9														9		
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18														18		
19														19		
20														20		
21														21		
22														22		
23														23		
24														24		
25	0	0.14	0.59		3.5	0	3.5	1.8	2.1			0.8	1.0	25		7.39
26	0	0.14	0.53		3.5	0	3.5	1.7	1.9			0.9	1.1	26	8.31	7.28
27	0	0.13	0.53		3.6	0	3.6	1.7	1.9	1.5	1.8	1.0	1.1	27	8.34	7.32
28	0	0.13	0.19		3.7	0	3.7	1.7	1.9	1.4	1.8	0.9	1.0	28	8.39	8.46
29	0	0.15	0.58	0.43	3.7	0	3.7	n/a	n/a	n/a	n/a	0.9	1.1	29	8.46	7.35
30	0	0.15	0.62		3.5	0	3.5	1.7	2.0	1.5	1.8	1.0	1.1	30	8.41	7.30
Avg.	0	0.14	0.51	0.43	3.6	0	3.6	1.7	2.0	1.5	1.8	0.9	1.1	Avg.	8.38	7.52
Max.	0	0.15	0.62	0.43	3.7	0	3.7	1.8	2.1	1.5	1.8	1.0	1.1	Max.	8.46	8.46
Min.	0	0.13	0.19	0.43	3.5	0	3.5	1.7	1.9	1.4	1.8	0.8	1.0	Min.	8.31	7.28

[illegible]

**Bacteriological &
Physical Parameters**

 City of Flint Water Treatment Plant
WSSN: 2310

April 2014

Page 5

Date	Total Coliform						Standard Plate Count		Wind Direction	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap			Raw	Raw	Tap	Raw
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25	1		12	0	1	0		< 2		11.0				
26	1		12	0	1	0	> 1476	< 2		11.4				
27	1		12	0	1	0	142	< 2		11.1				
28	1		8	0	1	0	532	< 2		11.5				
29	1		0	0	1	0		< 2		12.1				
30	1		4	0	1	0	1246	< 2		13.5				
Avg.							n/a	< 2		11.8				
Max.							> 1476	< 2		13.5				
Min.							142	< 2		11.0				

**Distribution System
Monitoring**

 City of Flint Water Treatment Plant
WSSN: 2310

April 2014

Page 6

Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										Number of Samples
	1	2	3	4	5	6	7	8	CS	WR	
1											0
2											0
3											0
4											0
5											0
6											0
7											0
8											0
9											0
10											0
11											0
12											0
13											0
14											0
15											0
16											0
17											0
18											0
19											0
20											0
21											0
22											0
23											0
24											0
25											0
26											0
27											0
28											0
29	1.0	0.8	1.0	0.7	0.8	0.8	1.1	0.8	0.7	0.9	10
30											0
31											0

Distribution Sample Summary	
Total # of routine distribution samples analyzed	115
Total # of routine distribution samples required	100

Distribution Disinfectant Residual Summary	
Percent samples with a detectable disinfectant residual	100
Average disinfectant residual this month	0.9

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

[illegible]

Rennaker, Joanne (DEQ)

From: Arduin, Jim (DEQ)
Sent: Friday, March 14, 2014 11:06 AM
To: Busch, Stephen (DEQ)
Subject: FW: Bray road consent order
Attachments: SGR5COPIER14031408250.pdf

Steve,

You may want to look at the Statement of Purpose section to see if you can live with Mike's proposed changes.

Jim

James Arduin
Senior Geologist
Michigan Department of Environmental Quality
Office of Waste Management and Radiological Protection
(517) 284-6652

From: Robinson, Michael [<mailto:MRobinson@wnj.com>]
Sent: Friday, March 14, 2014 8:28 AM
To: Arduin, Jim (DEQ); Brim, Richard (DEQ)
Subject: Bray road consent order

Here is the draft consent order with the City's comments. Jim, I will call you in about 20 minutes. You should focus on Sections 1-3.

Privileged and Confidential Settlement Communication

This document is for the purpose of settlement and is subject to the privilege that applies to communications made in settlement negotiations. It is provided solely for the consideration and use of the intended recipient(s), their principals, and their legal counsel. It should not be disclosed to any other person without the express consent of the Department of Environmental Quality.

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF WASTE MANAGEMENT AND RADIOLOGICAL PROTECTION

In the matter of the
administrative proceedings against
City of Flint, doing business at
5200 Bray Road, Genesee Township,
Genesee County, Michigan

OWMRP Order No. 115-____ - ____

CONSENT ORDER

This proceeding results from unresolved allegations specified in the Letters of Warning, (LOWs) issued on April 9, 2001, and February 14, 2002, and Compliance Communications, dated April 15, 1997, April 19, 2002, September 8, 2003, October 28, 2003 and January 18, 2011, by the Department of Environmental Quality ("DEQ"). (Attachment 1). The DEQ, Office of Waste Management and Radiological Protection ("OWMRP") alleges that the city of Flint ("Respondent") at 5200 Bray Road, Genesee Township, Genesee County, Michigan (the "Site"), placed or allowed the placement of solid waste in an Open Dump at the Site,

abandoned solid waste in place of other disposal in an Open Dump at the Site, or otherwise

violated engaged in the disposal of solid waste at the Site in violation of Part 115, Solid Waste

Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, Michigan Compiled Laws ("MCL") 324.101 *et seq.* ("NREPA"), and the administrative rules promulgated under Part 115. The Respondent and the DEQ agree to resolve the alleged violations set forth in the above-referenced LOWs and Compliance Communications by entry of this Consent Order.

STATEMENT OF PURPOSE

In entering into this Consent Order, the mutual objectives of the Respondent and the DEQ are to address the Open Dump created at the Site, eliminate the surface water discharge from the Site to the Cornwell Drain, ~~and~~ allow the Respondent to reconstruct the system used to manage drinking water treatment plant (WTP) residuals at the Site, *and to continue to manage lime residuals from the WTP at the Site.*

had unauthorized water discharges

and 31

and 31.

and in this Consent Order

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To accomplish these objectives, the Respondent agrees to determine the horizontal and vertical extent and character of any solid waste historically disposed of at the Site, including, but not limited to, the WTP residuals and any solid wastes identified as being disposed of in the above-referenced LOWs and Compliance Communications. Consistent with the waste

some or all of characterization and other investigation data, the Respondent agrees to either remove and dispose of the solid waste at a disposal area that is licensed by the DEQ, or leave the solid waste in place and place final cover over it in accordance with the requirements of Part 115 and this Consent Order. In addition, the Respondent agrees to determine, by conducting ^{an} a remedial investigation, whether any response activities must be taken to address contamination caused by the unauthorized disposal of solid waste at the Site. The Respondent also agrees to manage the historically accumulated lime sludge at the Site as solid waste and dispose of it in accordance with Part 115 requirements, unless it is determined by proper characterization that the historically accumulated lime sludge can be authorized for use on farmland applied at appropriate agronomic rates or some other beneficial reuse. The Respondent agrees to include a plan for the removal of the historically accumulated lime sludge at the Site as a condition of this Order. *in accordance with NREPA.*

Finally, if the Respondent proposes to reconstruct the system for the ~~non-mechanical~~ dewatering of WTP residuals at the Site, then the Respondent agrees to submit plans and specifications and secure from the DEQ, Office of Drinking Water and Municipal Assistance ("ODWMA"), a public water supply construction permit issued under Section 4 of the Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), MCL 325.1001 *et seq.*, and the administrative rules under Act 399 prior to initiating any construction, alteration, addition, or improvement to such system. In lieu of disposal, a ~~solid waste~~ residuals management plan for the historical disposal of lime sludge and other WTP residuals, as well as lime sludge and any other WTP residuals generated in the future, must also be included as part of the construction permit application. The Respondent plans to participate in the Karegnondi Water Authority (KWA) to receive source water from Lake Huron for its drinking water supply and the use of its WTP to meet treatment requirements under Act 399. It will be approximately four years before the KWA infrastructure is built and water is available to the Respondent from KWA. The Respondent plans to use the Flint River as its ~~temporary~~ source water supply for its WTP until KWA water is fully available. Public improvement projects under Act 399 are required to be

and to possibly continue to use Flint River water as a supplement to KWA₂ water and as back to KWA water to respond to emergencies.

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completed for Respondent to receive water from the KWA. The 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.

*also
request
this
as new
3.13*

I. DEFINITIONS

- 1.1 "Act 399" means the Safe Drinking Water Act, 1976 PA 399, as amended, MCL 325.1001 *et seq.*
- 1.2 "FAM" means the financial assurance mechanism acceptable to the DEQ to ~~pay~~ ^{ensure payment} for monitoring, operation and maintenance, oversight, and other costs ~~determined by the DEQ to be necessary to ensure the effectiveness and integrity of the remedial action.~~ The FAM is a component of the Remedial Action Plan.
- 1.3 "NREPA" means the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCL 324.101 *et seq.*
- 1.4 "Open Dump" means any area, place, or property where solid waste has been illegally disposed of or abandoned in place of other disposal. For the purposes of this Consent Order, the Open Dump includes any solid waste historically disposed of at the Site, ~~including, but not limited to, the WTP residuals and any solid wastes identified as being disposed of in the above referenced LOWs and Compliance Communications.~~
- 1.5 "Part 115" means Part 115, Solid Waste Management, of the NREPA, MCL 324.11501 *et seq.*, and the Part 115 Administrative Rules.
- 1.6 "Part 115 Rules" means the administrative rules promulgated under Part 115.
- 1.7 "Part 201" means Part 201, Environmental Remediation, of the NREPA, MCL 324.20101 *et seq.*, and the Part 201 Administrative Rules.

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- 1.8 "Residuals Management Plan" means a DEQ-approved plan to ^{address} ~~remove~~ both historical and future accumulations of lime sludge and other WTP residuals ^{at} ~~from~~ the Site.
- 1.9 "Site" means the property located at 5200 Bray Road, Genesee Township, Genesee County, Michigan. The Site occupies approximately 76 acres of land adjacent to the Cornwell Drain on its northern boundary. The Cornwell Drain is a tributary to the Flint River.
- 1.10 "Solid Waste" as used in this Consent Order means "solid waste" as defined in Part 115 of the NREPA, MCL 324.11506(1), including any solid waste that has been disposed of at the Site ~~and the lime sludge from WTP operations conducted by the Respondent.~~

II. STIPULATIONS

The Respondent and the DEQ stipulate as follows:

- 2.1 Pursuant to its authority under Part 115, ^{and 31} the DEQ promulgated administrative rules necessary to implement Part 115. ~~These rules are set forth in the 2005 Annual Administrative Code Supplement (AACS), R 209.4101 et seq. ("Part 115 Rules").~~
- 2.2 Pursuant to its authority under Act 399, the DEQ promulgated administrative rules necessary to implement Act 399. These rules set are set forth in the 2009 AACS, R 325.10101 et seq. ("Act 399 Rules").
- 2.3 Pursuant to the NREPA and Executive Order No. 2011-1, the Director of the DEQ ("Director") is the state official and the DEQ is the state agency charged with the administration and enforcement of Part 115 ^{Part 31} and Act 399. This Consent Order is authorized under MCL 324.11519(2) and MCL 325.1022.
- 2.4 The Respondent is a "person" as defined by MCL 324.301(g) and MCL 325.1002(m).

Privileged and Confidential Settlement Communication

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- 2.5 The Respondent owns and operates the Site. The Respondent is a municipality in the state of Michigan.
- 2.6 The Site consists of a WTP residuals area and contains various water level control structures and discharge points to the Cornwell Drain, and an area where solid waste has been disposed of in the Open Dump. Attachment 2 is an aerial schematic of the Site and shows the approximate boundaries of the WTP residuals area and the Open Dump.
- 2.7 The Respondent stipulates that the issuance and entry of this Consent Order is proper and acceptable. This Consent Order shall be considered a final order of the DEQ and shall become effective on the date it is signed by the Chief of the OWMRP *and the Chief of the WPD.* ~~("Office-Chief"), designee of the Director, pursuant to MGL 324-301(b) of the NREPA.~~
- 2.8 The Respondent agrees to fully and strictly comply with all provisions of Part 115 and Act 399, the Part 115 Rules, the Act 399 Rules, and all other applicable state and federal statutes *in implementing this Consent Order.* *part 31*
- 2.9 The Respondent and the DEQ agree that the signing of this Consent Order is for settlement purposes only and does not constitute an admission by the Respondent of *any fact or law or of* the allegations contained in the above-referenced LOWs and Compliance Communications or that the law has been violated.
- 2.10 The Respondent, all Respondent's successors and assigns, and the DEQ agree to and shall be bound by the requirements of this Consent Order.

Privileged and Confidential Settlement Communication

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III. COMPLIANCE PROGRAM

this Consent Order and in

In order to resolve the violations alleged in the above-referenced LOWs and Compliance Communications, the Respondent shall achieve and maintain compliance with the requirements specified below in accordance with the following schedule:

3.1 On and after the effective date of this Consent Order, the Respondent shall ^{*use best efforts to ensure*} ensure that the Site is secure and that, pursuant to R 299.4128(1), illegal dumping does not occur at the Site.

3.2 Within ^{*sixty (60)*} ~~thirty (30)~~ days after the effective date of this Consent Order, the Respondent shall plug or cap the outlet tower identified in Attachment 2 and take all necessary actions to terminate any surface water discharge to the Cornwell Drain. Respondent will not place the outlet tower back into service unless proper permits are acquired.

3.3 Within ^{*ninety (90)*} ~~thirty (30)~~ days after the effective date of this Consent Order, the Respondent shall submit to the ODWMA for review and approval, an administratively complete Act 399 construction permit application for the reconstruction of the ~~port-mechanical~~ ^{*non-mechanical*} dewatering system for WTP residuals at the Site, including provisions and a schedule for the construction of a physical barrier that will separate the area proposed for the reconstructed dewatering system from the area where the other solid waste is located on the Site. The permit application will clearly identify any areas that will not be used as part of the reconstructed ~~non-mechanical~~ dewatering system and identify any slurry inlet points located outside the system footprint so such inlet points can be permanently capped by the Respondent. The permit application will also include a basis of design for the management of WTP residuals within the system.

3.4 Within ^{*ninety (90)*} ~~thirty (30)~~ days after the effective date of this Consent Order, the Respondent shall submit to the OWMRP for review and approval, any portion of the dewatering system residuals management plan submitted to the ODWMA that is required to comply with Part 115.

Privileged and Confidential Settlement Communication

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3.5 Within two hundred and forty (240) days of the effective date of this Consent Order, the Respondent shall submit to the DEQ for review and approval, a report that summarizes the current conditions at the Site ("Site Conditions Summary Report") or "SCSR"). The SCSR shall include, at a minimum, the following:

- (a) Identification of the horizontal and vertical extent of solid waste at the Site;
- (b) Estimates, in cubic yards, of the volumes of un-impacted concrete, lime, and other solid waste at the Site;
- (c) Characterization of the solid wastes at the Site including data to support the characterizations;
- (d) Identification, characterization, and delineation of ~~any~~ environmental impacts at the Site, *contamination, if any, from the disposal of solid waste at the Site*
- (e) Identification of the general geologic and hydrogeologic conditions at the Site; and
- (f) Copies of any DEQ-approved inertness *or other* designations and/or DEQ-approved "other beneficial reuse" authorizations obtained by Respondent.

3.6 If the Site Conditions Summary Report fails to delineate the horizontal and vertical extent of solid waste, or fails to delineate any contamination identified at the Site, or fails to support conclusions identified in the report, *or is disapproved for other specified deficiencies*, the Respondent shall develop and implement a remedial investigation. A complete and technically adequate work plan for a remedial investigation ("Remedial Investigation Work Plan") shall be submitted to the DEQ within sixty (60) days of the DEQ's notification that the Remedial Investigation Work Plan is necessary. Upon approval by the DEQ, the Respondent shall implement the Remedial Investigation Work Plan in accordance with the schedule contained therein. The Respondent shall submit, for review and approval by DEQ, final results and conclusions of the remedial

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investigation in the form of a written report ("Remedial Investigation Report") within thirty (30) days of completion of the remedial investigation.

3.7 If the DEQ-approved SCSR or Remedial Investigation Report identifies no ^{presence of certain} environmental impacts at the Site and the only issue to address is the solid waste identified at the Site, the Respondent may elect to remove and properly dispose of the ^{contamination above applicable criteria} such solid waste identified at the Site by completing the following requirements:

(a) Within thirty (30) days of receipt of written approval of the SCSR or Remedial Investigation Report by the DEQ, the Respondent shall submit to the DEQ for review and approval, a Solid Waste Removal Plan "(SWRP)" for the Site. This plan will provide details regarding the proposed removal and legal disposal of the solid waste identified at the Site. In addition, the plan shall include a proposed schedule for the waste removal and disposal, and a proposed waste removal confirmation sampling plan.

^{and} (b) Within sixty (60) days of completion of the SWRP, the Respondent shall submit to the DEQ for review and approval, a Solid Waste Removal Report for the Site. This report will contain summaries of waste volumes, final disposition of wastes, copies of landfill receipts, copies of paperwork required by "other beneficial reuse" authorizations, and waste removal confirmation sampling results.

3.8 If the Respondent ^{WTP residuals} identifies environmental impacts and/or elects to leave the solid waste ^{and} in place at the Site, then the Respondent shall complete the requirements of Paragraphs 3.9 through 3.12, as follows:

3.9 The Respondent shall submit to the DEQ for review and approval, an Assessment of Corrective Measures ("ACM") that is in accordance with R 299.4443 of the Part 115 Rules within ninety (90) days of written approval by the DEQ of the RI Report. The ACM shall include an analysis of each potential remedy considered, identify the final remedial action proposed by the Respondent, and provide an explanation of how that proposed remedial action will meet applicable cleanup criteria of Part 201 and be in compliance with Part 115 and the Part 115 Rules.

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3.10 The Respondent shall submit to the DEQ for review and approval, a complete and *(if needed and if Respondent can provide a FAM)* technically adequate Remedial Action Plan ("RAP") for the Open Dump that is in compliance with the requirements of R 299.4444 of the Part 115 Rules within one hundred twenty (120) days of receipt of written approval by the DEQ of the ACM. The RAP shall include a detailed schedule for implementation and a FAM. The RAP shall be consistent with the results of the remedial investigation and any other monitoring data collected, reports submitted, and/or investigations conducted prior to submittal of the RAP. The RAP, when implemented, shall comply with the applicable cleanup criteria of Part 201 and, upon approval of the plan by the DEQ, the Respondent shall implement the approved RAP in accordance with the schedule contained therein.

3.11 If, in accordance with *and WTP residuals* the approved ACM, the Respondent elects to cap and close in-place the solid waste identified at the Site, the Respondent shall, as part of the RAP, submit to the DEQ for review and approval, a Capping and Closure Plan and schedule for implementation ("CCP") and a Post Closure Plan and schedule for implementation ("PCP") for the Site that are in compliance with the requirements of R 299.4425, *to the extent needed,* R 299.4447, respectively, of the Part 115 Rules and Part 115. Upon DEQ approval of the CCP and the PCP, the Respondent shall implement the plans in accordance with the schedules contained therein. If the Respondent lacks the expertise and/or manpower to conduct the work in accordance with the DEQ-approved CCP, the PCP, and the Part 115 Rules, the Respondent shall contract the work to be performed by a contractor.

3.12 If, in accordance with *and WTP residuals* an approved ACM, the Respondent elects to cap and close in-place the solid waste identified at the Site, the Respondent shall, as part of the RAP, submit to the DEQ for review and approval, a Hydrogeologic Monitoring Plan and monitoring schedule ("HMP") for the Site that complies with R 299.4904, R 299.4905, R 299.4906, R 299.4907, and R 299.4908 of the Part 115 Rules. Upon approval by the DEQ, the Respondent shall implement the HMP in accordance with the schedule contained therein. *qualified* ~~In addition, Respondent shall be required to provide appropriate financial assurance as required by Part 115.~~ *if needed.*

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IV. DEQ APPROVAL OF SUBMITTALS

- 4.1 For any work plan, proposal, or other document, excluding applications for permits or licenses, that are required by this Consent Order to be submitted to the DEQ by the Respondent, the following process and terms of approval shall apply.

- 4.2 To be approved by the DEQ, any work plan, proposal, or other document required to be submitted by this Consent Order shall include all of the information required by the applicable statute and/or rule and all of the information required by the applicable paragraph(s) of this Consent Order.

- 4.3 Upon DEQ approval, or approval with modifications, of a work plan, proposal, or other document, such work plan, proposal, or other document shall be incorporated by reference into this Consent Order and shall be enforceable in accordance with the provisions of this Consent Order.

- 4.4 In the event the DEQ disapproves a work plan, proposal, or other document, it shall notify the Respondent, in writing, of the specific reasons for such disapproval. The Respondent shall submit, within ^{sixty (60)} ~~thirty (30)~~ days of receipt of such disapproval, a revised work plan, proposal, or other document that adequately addresses the reasons for the DEQ's disapproval. *to the extent required by NREPA.*

- 4.5 In the event the DEQ approves with specific modifications, a work plan, proposal, or other document, it shall notify the Respondent, in writing, of the specific modifications required to be made to such work plan, proposal, or other document prior to its implementation and the specific reasons for such modifications. The DEQ may require the Respondent to submit, prior to implementation and within ^{sixty (60)} ~~thirty (30)~~ days of receipt of such approval with specific modifications, a revised work plan, proposal, or other document that adequately addresses such modifications. *to the extent required by NREPA.*

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- 4.6 A finding of approval or approval with modification of a submission shall not be construed to mean that the DEQ concurs with any of the conclusions, methods, or statements in the submission or warrants that the submission comports with law.
- 4.7 Failure by the Respondent to submit an approvable work plan, proposal, or other document within the applicable time period specified above shall subject the Respondent to the enforcement provisions of this Consent Order including, but not limited to, the stipulated penalty provisions commencing on the date the revised work plan, proposal, or other document was due and accumulating until an approvable work plan, proposal, or other document is submitted.
- 4.8 Any delays caused by the Respondent's failure to submit an approvable work plan, proposal, or other document when due shall in no way affect or alter the Respondent's responsibility to comply with any other deadline(s) specified in this Consent Order.
- 4.9 No informal advice, guidance, suggestions, or comments by staff of the DEQ regarding reports, work plans, proposals, plans, specifications, schedules, or any other writing submitted by the Respondent will be construed as relieving the Respondent of its obligation to obtain written approval of the DEQ if and when required by this Consent Order.

V. MODIFICATIONS AND EXTENSIONS

- 5.1 At the request of the Respondent, a work plan, proposal, or other document approved or approved with specific modifications by the DEQ, with the exclusion of the specified deadlines set forth in Section III, Compliance Program, of this Consent Order, may be modified by the OWMRP Lansing District Supervisor. Any modifications or extensions in regard to the Act 399 construction permit must be approved by the ODWMA Lansing District Supervisor
- 5.2 The Respondent and the DEQ agree that the Office Chief may, but in no circumstances is obligated to, grant the Respondent an extension of the specified deadlines set forth in

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this Consent Order. Any extension shall be preceded by a timely written request, received by the DEQ no later than ten (10) business days prior to the pertinent deadline, which shall include:

- (a) An identification of the specific deadline(s) of this Consent Order that will not be met.
- (b) A detailed description of what will prevent the Respondent from meeting the deadline(s).
- (c) A description of the measures the Respondent has taken and/or intends to take to meet the required deadline(s).
- (d) The length of the extension requested and the specific date(s) on which the obligation(s) will be met.

5.3 The Office Chief shall respond promptly to such requests and shall not unreasonably withhold approval for such requests.

5.4 Any extension of the specified deadlines or other modifications and amendments of this Consent Order shall require a formal written amendment of this Consent Order, shall be signed by the Respondent and the DEQ ("Parties"), shall have as their effective date the date on which they are signed by the Office Chief, and shall be incorporated into and become an enforceable part of this Consent Order.

VI. REPORTING

6.1 With the exception of the Act 399 construction permit application required by Paragraph 3.3 of this Consent Order, the Respondent shall submit all items required in Section III, Compliance Program, to the Lansing District Supervisor, OWMRP, DEQ, P.O. Box 30242, Lansing, Michigan 48909-7742, unless specifically directed otherwise within this Consent Order. The Respondent shall submit the Act 399 construction permit

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application required by Paragraph 3.3 of this Consent Order and any documents that pertain to, or are required by, the Act 339 application or permit, to the Lansing District Supervisor, ODWMA, DEQ, P.O. Box 30242, Lansing, Michigan 48909-7742. The cover letter with each submittal shall identify the specific paragraph and requirement of this Consent Order that the submittal is intended to satisfy. If the address of a District Supervisor changes, the Respondent will be notified and shall make all subsequent submittals to any new address of which they are notified.

- 6.2 The Respondent shall verbally report any violation(s) of the terms and conditions of this Consent Order to the OWMRP District Supervisor *by Respondent* by no later than the close of the next business day following detection of such violation(s) and shall follow such notification with a written report within five (5) business days following detection of such violation(s). The written report shall include a detailed description of the violation(s), the precise cause or causes of the violation(s), a detailed description of any action(s) taken or proposed to correct the violation(s), and a schedule for the implementation of any proposed corrective action(s). The Respondent shall report any anticipated violation(s) of this Consent Order to the OWMRP District Supervisor in advance of the relevant deadlines, whenever possible.

VII. RETENTION OF RECORDS

- 7.1 Upon request by an authorized representative of the DEQ, the Respondent shall make available to the DEQ all records, plans, logs, and other documents required to be maintained under this Consent Order, or pursuant to Part 115, the Part 115 Rules, Act 399, or the Act 399 Rules. Within 30 days of the effective date of this Consent Order, Respondent shall designate, in writing in accordance with Section VI of this Consent Order, a location for retention of all such documents that is accessible to DEQ staff within normal business hours. All such documents shall be retained at the designated location for at least a period of three (3) years from the date of generation of the record unless a longer period of record retention is required by Part 115, the Part 115 Rules, Act 399, or the Act 399 Rules. If the designated location changes, the

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Respondent shall provide written notice of such to the DEQ in writing in accordance with Section VI of this Consent Order.

VIII. RIGHT OF ENTRY

- 8.2 The Respondent shall allow any authorized representative or contractor of the DEQ, upon presentation of proper credentials, to enter upon the premises of the Site at all reasonable times for the purpose of monitoring compliance with the provisions of this Consent Order. This paragraph in no way limits the authority of the DEQ to conduct tests and inspections pursuant to the NREPA and its rules or any other applicable statutory provision.

IX. FINES, COSTS, AND PENALTIES

- 9.1 Within thirty (30) days of the effective date of this Consent Order, the Respondent shall pay the sum of \$1,000 to the State of Michigan in settlement of the DEQ's claim for civil fines arising from the violations alleged in the above-referenced LOWs and Compliance Communications.

- 9.2 For each failure to comply with the provisions of Section III, Compliance Program, of this Consent Order, the Respondent shall pay to the State of Michigan stipulated penalties in an amount of ^{\$1,000} \$250 per violation per day for one (1) through seven (7) days of violation; ^{\$250} \$500 per violation per day for eight (8) through fourteen (14) days of violation; and ^{\$500} \$750 per violation per day for each day of violation thereafter. Stipulated penalties shall be paid within thirty (30) days after receiving a written demand made by the DEQ.

- 9.3 To ensure timely payment of any ^{civil fines} penalties, and costs due under this Consent Order, the Respondent shall pay an interest penalty to the State of Michigan each time the Respondent fails to make a complete or timely payment. This interest penalty shall be based on the rate set forth at Section 6013(6) of the Revised Judicature Act, 1961 PA 236, as amended, MCL 600.6013(6), using the full increment of amount due as principal, and calculated from the due date for the payment until the delinquent payment

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is finally made in full.

- 9.4 The Respondent shall make all payments due under this Consent Order by certified or cashier's check made payable to the "State of Michigan" and mailed to the DEQ, Revenue Control Unit, P.O. Box 30657, Lansing, Michigan 48909-8157, or hand delivered to the DEQ, Revenue Control Unit, 1st Floor, Van Wagoner Building, 425 West Ottawa Street, Lansing, Michigan 48933. To ensure proper credit, all payments made pursuant to this Consent Order must include Payment Identification Number OWMRP _____ on the front of the check and/or in the cover letter with the payment.
- 9.5 ~~The Respondent agrees not to contest the legality of the civil fine or the costs of surveillance and enforcement paid pursuant to this section.~~ The Respondent ~~further~~ agrees not to contest the legality of any stipulated penalties or interest penalties assessed pursuant to this section but reserves the right to dispute the factual basis upon which a demand by the DEQ for stipulated penalties or interest penalties is made.
- 9.6 Liability for or payment of stipulated penalties pursuant to this Consent Order shall not preclude the State of Michigan from seeking injunctive relief or other relief for the Respondent's failure to comply with the requirements of this Consent Order and/or any permit(s) or license(s) required to comply with this Consent Order.

X. DISPUTE RESOLUTION

- 10.1 Unless otherwise provided in this Consent Order, the dispute resolution procedures of this section shall be the exclusive mechanism to resolve disputes arising under, or with respect to, this Consent Order and shall apply to all provisions of this Consent Order. However, the procedures set forth in this section shall not apply to actions by the ~~S~~ State of Michigan to enforce obligations of the Respondent that have not been disputed in accordance with this section. Engagement of a dispute resolution between the Parties shall not be cause for the Respondent to delay the performance of any compliance requirements or response activity. Any dispute that arises under this Consent Order shall

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in the first instance be the subject of informal negotiations between the Parties. The period of negotiations shall not exceed twenty (20) days from the date of written notice by any Party that a dispute has arisen, unless the time period for negotiations is modified by written agreement between the Parties. The dispute shall be considered to have arisen when one Party sends the other Party a written notice of dispute. If agreement cannot be reached on any issue within this twenty- (20-) day period, the DEQ shall provide a written statement of its decision to the Respondent and, in the absence of initiation of formal dispute resolution by the Respondent under Paragraph 10.2, the DEQ position, as outlined in its written statement of decision, shall be binding on the Parties.

10.2 If the Respondent and DEQ cannot informally resolve a dispute under Paragraph 10.1, the Respondent may initiate formal dispute resolution by requesting a review of the disputed issues by the Office Chief. This written request must be filed with the Office Chief within fifteen (15) days of the Respondent's receipt of the DEQ's statement of decision that is issued at the conclusion of the informal dispute resolution procedure set forth in Paragraph 10.1. The Respondent's request shall state the issues in dispute; the relevant facts upon which the dispute is based; any factual data, analysis, or opinion supporting its position; and all supporting documentation upon which the Respondent bases its position. Within fourteen (14) days of the Office Chief's receipt of the Respondent's request for a review of disputed issues, the Office Chief will provide a written statement of decision to the Respondent, which will include a statement of his/her understanding of the issues in dispute; the relevant facts upon which the dispute is based; any factual data, analysis, or opinion supporting her/his position; and all supporting documentation relied upon by the Office Chief's review of the disputed issues. The Office Chief's review of the disputed issues may be extended by written agreement of the Parties.

10.3 The written statement of the Office Chief issued under Paragraph 10.2 shall be binding on the Parties unless, within fifteen (15) days after receipt of the DEQ's written statement of decision, the Respondent files a petition for judicial review in a court of competent jurisdiction that shall set forth a description of the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the

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dispute must be resolved to ensure orderly implementation of this Consent Order.

Nothing in this Consent Order affects the limitations on the timing of judicial review of the DEQ decision regarding the selection, extent, or adequacy of any response activity.

10.4 An administrative record of the dispute shall be maintained by the DEQ. The administrative record shall include all of the information provided by the Respondent pursuant to Paragraph 10.1, as well as any other documents relied upon by the DEQ in making its final decision pursuant to Paragraph 10.2. Where appropriate, the DEQ shall allow submission of supplemental statements of position by the Parties to the dispute.

10.5 In ^{a judicial proceeding under 10.3 filed by Respondent,} proceeding on any dispute, the Respondent shall have the burden of demonstrating ~~by~~ ^{the administrative record} that the position of the DEQ is arbitrary and capricious or otherwise not in accordance with law. In ^{such} proceedings on any dispute initiated by the Respondent, the Respondent shall bear the burden of persuasion on factual issues.

10.6 Notwithstanding the invocation of dispute resolution proceedings, stipulated penalties shall accrue from the first day of any failure or refusal to comply with any term or condition of this Consent Order, but payment shall be stayed pending resolution of the dispute. Stipulated penalties shall be paid within thirty (30) days after the resolution of the dispute. The Respondent shall pay that portion of a demand for payment of stipulated penalties that is not subject to dispute resolution procedures in accordance with and in the manner provided in Section IX, Fines, Costs, and Penalties, of this Consent Order.

XI. FORCE MAJEURE

11.1 The Respondent shall perform the requirements of this Consent Order within the time limits established herein unless performance is prevented or delayed by events that constitute a "Force Majeure." Any delay in the performance attributable to a "Force Majeure" shall not be deemed a violation of the Respondent's obligations under this Consent Order in accordance with this section.

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- 11.2 For the purpose of this Consent Order, "Force Majeure" means an occurrence or nonoccurrence arising from causes not foreseeable, beyond the control of, and without the fault of the Respondent, such as: an Act of God, untimely review of permit applications or submissions by the DEQ or other applicable authority, and acts or omissions of third parties that could not have been avoided or overcome by the Respondent's diligence and that delay the performance of an obligation under this Consent Order. "Force Majeure" does not include, among other things, unanticipated or increased costs, ~~changed financial circumstances~~, or failure to obtain a permit or license as a result of the Respondent's actions or omissions. *"Force majeure" also includes the inability of Respondent to comply with this Consent Order due to the lack of funds.*
- 11.3 The Respondent shall notify the DEQ, by telephone, within forty-eight (48) hours of discovering any event that causes a delay in its compliance with any provision of this Consent Order. Verbal notice shall be followed by written notice within ten (10) calendar days and shall describe, in detail, the anticipated length of delay, the precise cause or causes of delay, the measures taken by the Respondent to prevent or minimize the delay, and the timetable by which those measures shall be implemented. The Respondent shall adopt all reasonable measures to avoid or minimize any such delay.
- 11.4 Failure of the Respondent to comply with the notice requirements of Paragraph 11.3, above, shall render this section void and of no force and effect as to the particular incident involved. The DEQ may, at its sole discretion and in appropriate circumstances, waive the notice requirements of Paragraph 11.3.
- 11.5 If the Parties to this Consent Order agree that the delay or anticipated delay was beyond ~~the control of the Respondent~~, *a force majeure.* This may be so stipulated and the parties to this Consent Order may agree upon an appropriate modification of this Consent Order. If the Parties to this Consent Order are unable to reach such agreement, the dispute shall be resolved in accordance with Section X, Dispute Resolution. The burden of proving that any delay was beyond ~~the reasonable control of the Respondent~~, *a force majeure*, and that all the requirements of this section have been met by the Respondent, is on the Respondent.
- 11.6 An extension of any given compliance date based upon a particular incident does not

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necessarily mean that the Respondent qualifies for an extension of a subsequent compliance date without providing proof regarding each incremental step or other requirement for which an extension is sought.

XII. GENERAL PROVISIONS

- 12.1 With respect to any violations not specifically addressed and resolved by this Consent Order, the DEQ reserves the right to pursue any other remedies to which it is entitled for any failure on the part of the Respondent to comply with the requirements of any state or federal law, including the NREPA and its rules.
- 12.2 Execution of the schedule contained in this Consent Order shall not be construed to waive, estop, or otherwise diminish the DEQ's right to seek or impose civil liability upon, and seek appropriate relief from, the Respondent for degradation of waters of the State and the designated uses thereof arising out of the failure of the Respondent to ~~achieve a proper cleanup pursuant to this Consent Order.~~ *comply with*
- 12.3 This Consent Order does not constitute a warranty or representation of any kind by the DEQ that the response activities performed in accordance with this Consent Order or DEQ-approved work plans will result in the achievement of the remedial criteria established by law, or that the response activities will ensure protection of public health, safety, or the environment.
- 12.4 This Consent Order in no way affects the Respondent's responsibility to comply with any other applicable state, federal, or local laws or regulations ~~including, without limitation, any corrective action or similar requirements applicable to the Site pursuant to the NREPA and its rules.~~ *not referenced in this Consent Order*
- 12.5 Nothing in this Consent Order is or shall be considered to affect any liability the Respondent may have for natural resources damages caused by the Respondent's ownership and/or operation of the Site. The State of Michigan does not waive any rights to bring an appropriate action to recover such damages to the natural resources.

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state → 12.6 The Parties agree that the terms and conditions of this Consent Order will be enforceable in circuit court. The Parties further agree that the appropriate venue for the enforcement of this Consent Order shall be the Circuit Court for Genesee County or the Circuit Court for Ingham County, State of Michigan, which courts shall also be appropriate for dispute resolution.

12.7 If any provision or authority of this Consent Order or the application of this Consent Order to any Party or circumstances is held by any judicial or administrative authority to be invalid, the application of such provisions to other Parties or circumstances and the remainder of the Consent Order shall remain in force and shall not be affected thereby.

12.8 The provisions of this Consent Order shall be binding on the Respondent, the DEQ, and their successors and assigns. The Respondent shall give notice of this Consent Order to any prospective successor in interest prior to transfer of ownership of the Site property or any portion thereof and shall notify the DEQ of such proposed sale or transfer.

XIII. TERMINATION

13.1 This Consent Order shall remain in full force and effect until expressly terminated by a written Notice of Termination issued by the Office Chief. The Respondent may request that the Office Chief issue a written Notice of Termination at any time after achieving full compliance with this Consent Order. Such a request shall consist of a written certification that the Respondent has fully complied with all of the requirements of this Consent Order and has made payment of any ~~fees~~ ^{penalties}, penalties, and costs required under this Consent Order. Specifically, this certification shall include:

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- (a) The date of compliance with each provision of the compliance program in Section III of this Consent Order and the date any ~~times~~, penalties, or costs were paid;
 - (b) a statement that all required information has been reported to the District Supervisor;
 - (c) confirmation that all records required to be maintained pursuant to this Consent Order are being maintained by the City at the location designated pursuant to Paragraph 7.1 pf this Consent Order; and
 - (d) additional ~~relevant~~ information requested by the Office Chief.
- ← relevant to determining compliance with this Consent Order*
- 13.2 The Office Chief shall issue a written Notice of Termination unless ~~the DEQ determines~~ *that* the Respondent has not submitted the certification required under this section, has failed to submit ~~the~~ *such* information specifically requested by the Office Chief, or has failed to comply with, or complete, all of the requirements of this Consent Order.

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XIV. SIGNATORIES

The undersigned CERTIFY they are fully authorized by the party they represent to enter into this Consent Order to comply by consent and to EXECUTE and LEGALLY BIND that party to it.

CITY OF FLINT

DEPARTMENT OF ENVIRONMENTAL
QUALITY

By: _____

Dan Wyant
Director

Title: _____

By: _____

Date: _____

Bryce Feighner, Chief
Office of Waste Management and
Radiological Protection

Date: _____

APPROVED AS TO FORM:

Bill Schuette
Attorney General

[NAME] (P_____)
Assistant Attorney General
Environment, Natural Resources, and
Agriculture Division
Department of Attorney General
Constitution Hall, 5th Floor, South Tower
525 West Allegan Street
Lansing, Michigan 48933

Date: _____

Rennaker, Joanne (DEQ)

From: Johnson, Mark <johnson.mark@epa.gov>
Sent: Monday, June 23, 2014 6:24 PM
To: Crooks, Jennifer
Cc: Poy, Thomas; Prysby, Mike (DEQ); Busch, Stephen (DEQ); Shoven, Heather; Murphy, Thomas
Subject: FW: Briefing -- Flint River for drinking water, Michigan

Jennifer

Here is an initial response from Joe Carpenter, a water quality engineer at the CDC Waterborne Disease Prevention Program in Atlanta. His comments focus on the pH of the finished water as a possible contributor to the reports of skin rashes. In this files that were provided, there were pH measurements for the last week of April. Are there additional data available to determination if pH fluctuations in the distribution system may correspond to the complaints?

Just looking at it from a chemical perspective, I don't see anything in the analysis that would be of a health concern. We can have a follow-up discussion with CDC staff about other constituents if that would be helpful.

Mark

Mark D. Johnson, PhD, DABT
 Regional Director/ Senior Environmental Health Scientist
 Agency for Toxic Substances and Disease Registry (ATSDR)
 77 West Jackson Blvd.
 Chicago, IL 60604
 e-mail: mdjohnson@cdc.gov
 phone: 312-353-3436 (office)

From: Carpenter, Joe (CDC/OID/NCEZID) [mailto:jcc0@cdc.gov]
Sent: Saturday, June 21, 2014 4:46 PM
To: Beach, Michael J. (CDC/OID/NCEZID); Johnson, Mark
Cc: Yoder, Jonathan S. (CDC/OID/NCEZID); Robinson, Felecia (CDC/OID/NCEZID) (CTR); Gargano, Julia Marie W. (CDC/OID/NCEZID); Sarisky, John (CDC/ONDIEH/NCEH); Blake, Robert G. (CDC/ONDIEH/NCEH)
Subject: RE: Briefing -- Flint River for drinking water, Michigan

Here is a recent article (06/12/2014) about the changes in lime addition at the Flint water plant. It might be a bit challenging to make pH adjustments quickly in the finished water if they had to make this significant lime addition adjustment. High pH from lime softening plants has been associated with consumer issues in the past. See below for a background document about lime softening and a WHO document about the health effects of both high and low pH values. Skin rashes are known to be caused by extreme pH variations in drinking water.

Hope some of this info is helpful.

Joe Carpenter

http://www.mlive.com/news/flint/index.ssf/2014/06/treated_flint_river_water_meet.html

FLINT, MI -- Workers at the city's water treatment plant have bumped up their use of lime in an effort to cut down on both water hardness and rising customer complaints.

Daugherty Johnson, utilities administrator at Flint's water treatment plant, said today, June 12, that 75 percent of raw water is now being treated with lime compared to 25 percent treatment when the city made the **initial switch** from using Lake Huron to using the Flint River as a drinking water source on April 25.

Background info about lime softening:

http://www.nesc.wvu.edu/pdf/dw/publications/ontap/2009_tb/lime_softening_DWFSOM41.pdf

Health Effects of pH -- WHO

http://www.who.int/water_sanitation_health/dwg/chemicals/en/ph.pdf

EFFECTS ON HUMANS

Exposure to extreme pH values results in irritation to the eyes, **skin**, and mucous membranes. Eye irritation and exacerbation of skin disorders have been associated with pH values greater than 11. In addition, solutions of pH 10–12.5 have been reported to cause hair fibres to swell (10). In sensitive individuals, gastrointestinal irritation may also occur. Exposure to low pH values can also result in similar effects. Below pH 4, redness and irritation of the eyes have been reported, the severity of which increases with decreasing pH. Below pH 2.5, damage to the epithelium is irreversible and extensive (10). In addition, because pH can affect the degree of corrosion of metals as well as disinfection efficiency, it may have an indirect effect on health.

From: Beach, Michael J. (CDC/OID/NCEZID)

Sent: Saturday, June 21, 2014 12:53 PM

To: Johnson, Mark (EPA) (CDC epa.gov)

Cc: Carpenter, Joe (CDC/OID/NCEZID); Yoder, Jonathan S. (CDC/OID/NCEZID); Robinson, Felecia (CDC/OID/NCEZID) (CTR); Beach, Michael J. (CDC/OID/NCEZID); Gargano, Julia Marie W. (CDC/OID/NCEZID); Sarisky, John (CDC/ONDIEH/NCEH); Blake, Robert G. (CDC/ONDIEH/NCEH)

Subject: FW: Briefing -- Flint River for drinking water, Michigan

Mark,

Am cc'ing our water engineer, Joe Carpenter, for his take on this. We have heard of the rashes related to switch to chloramine (not happening here) w, which has become very activist oriented but not sure from the data here what this might be. Also including the EH services Branch for input

Michael

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Please only print this e-mail if necessary.

From: Johnson, Mark (EPA) (CDC epa.gov)
Sent: Friday, June 20, 2014 5:57 PM
To: Beach, Michael J. (CDC/OID/NCEZID); Roberts, Virginia (CDC/OID/NCEZID)
Subject: FW: Briefing -- Flint River for drinking water, Michigan

Michael and Virginia

We were contacted by USEPA this week regarding complaints from residents of Flint, Michigan associated with the quality of their drinking water. There have been recent taste and odor complaints, but also claims of people developing rashes. The complaints seem to correspond to the timeframe the City of Flint switching from purchasing water from the City of Detroit to utilizing their own treatment system that takes water from the Flint River, which began in late April, 2014.

Although this is a regulatory compliance issue, ATSDR was contacted to assist in addressing health concerns in the community. Although the analytical testing does not indicate the presence of chemicals that appear to be a health concern, the fact that their raw water is coming from a new source raises questions about other constituents that have not been evaluated. We will be contacting the Michigan Dept. of Community Health, but we also wanted to contact your program to see if you get involved with these situations and can offer some advice.

Let me know what you think.

Mark

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From: Crooks, Jennifer
Sent: Friday, June 20, 2014 3:07 PM
To: Johnson, Mark
Cc: Poy, Thomas; Prysby, Mike (DEQ); Busch, Stephen (DEQ); Shoven, Heather; Murphy, Thomas
Subject: Briefing -- Flint River for drinking water, Michigan

Mark—as we discussed earlier this week, below is a briefing containing the information we discussed regarding the Flint, Michigan water supply. I am out of the office this coming week; if you have questions, please contact Tom Poy, Ground Water and Drinking Water Branch Chief.

Thank you for your time!

Jennifer

Drinking Water in Flint, Michigan

ISSUE: Flint began pumping/treating/distributing Flint River water as their drinking water source on April 25, 2014, and beginning in mid-May, there have been numerous complaints to the Region 5 Ground Water and Drinking Water Branch regarding the drinking water, including rotten egg smell, swamp water smell, people developing rashes. The Region immediately contacted and involved the Drinking Water program at the Michigan Dept of Environmental Quality (MDEQ).

BACKGROUND: Flint has been purchasing finished drinking water from Detroit for decades (source water is Lake Huron). It has been delivered by a large single pipeline from Detroit. In the late 1980's, the State drinking water staff requested that Flint renovate their old surface water treatment plant to meet the State's redundancy requirements, in case the single pipeline from Detroit was unable to transmit finished drinking water. Flint would treat Flint River water periodically throughout the year, to verify that the water treatment plant (WTP) was able to treat Flint River water that met Safe Drinking Water Act (SDWA) standards.

Over the past 15 years or so, Detroit has seen a decrease in its City population, and an increase in poverty/low income residents. Detroit currently has an Emergency Manager due to poor financial situation. (As an aside, last year the City of Highland Park told Detroit it was unable to pay its water/sewer bills, and currently has an Emergency Manager. Highland Park was unable to obtain funding to retrofit its surface water treatment plant, so Detroit is providing water/sewer currently to Highland Park for free.) In order to continue to provide adequately treated water that meets SDWA Health standards, the suburbs have been subsidizing the lower income residents for years. Consequently, communities like Flint have decided to find an alternate source of drinking water.

A regional water authority was formed in 2010, the Karegnondi Water Authority (KWA), which will serve water in mid-Michigan and the Thumb areas. Members of the KWA include Flint, Lapeer; and Genesee, Lapeer and Sanilac Counties. The KWA is currently constructing the Karegnondi pipeline to bring raw water from Lake Huron. It will be completed in about 2 years. Flint has an Emergency Manager now, and I think on paper, it looked like a savings to pump and treat Flint River water for the 2-year interim period prior to connecting to the Karegnondi pipeline, than to continue to pay Detroit prices for finished drinking water. MDEQ has worked long and hard with the City of Flint and water operators to get the WTP ready to treat Flint River water for the next few years. Complete operation/treatment began April 25, 2014.

In mid-May, Region 5 Ground Water and Drinking Water Branch began receiving calls from Flint citizens regarding the quality of the Flint drinking water. Complaints include rotten egg smell, swamp water smell, people developing rashes. I talked with Richard Benzie, the Community Drinking Water Unit Chief, at MDEQ about any possible chemical releases into the Flint River, and neither he nor Mike Prysby, the Lansing District engineer for Flint, have heard of anything such as this. The normal procedure of chemical releases is that Mike Prysby and Richard would be alerted/notified through the Pollution Emergency Alert System (PEAS), and that hasn't happened.

Mike Prysby has been working quite closely with the Operator-in-Charge at the Flint Water Treatment plant to prepare the WTP and operators to treat the Flint River water. Attached are several analytical results: July 2013 Test Run of Phase 2/5 contaminants conducted on the Flint River, sampled in July 2013; no exceedances are noted; detects of barium and selenium. The April 2014 Monthly Operation Report (MOR) which includes bacteriological analyses, was finalized in mid-May (includes only April 25-30 operation activity) with the following test results (sampled in May 2014),

that were provided last week by Steve Busch, the MDEQ Supervising District Engineer: Total Organic Carbon (TOC), Metals, Volatile Organic Carbon (VOC), Synthetic Organic Contaminants (SOC) (all 3 categories), and partial chemistry (which includes nitrates). As the WTP only operated for the last 6 days in April, the MOR results provide limited information. The Bacteriological Portion of the May Operating Period were due 6/10, but the operational monitoring won't be reported until 6/30.

FINDINGS: So, bottom line—yes, the raw water is a different quality and more variable than Lake Huron raw water that Detroit is using. The Flint River is not as high a quality water as Lake Huron, but they are pretreating with ozone, conducting softening to reduce hardness and organic precursors, and are working with chlorine application. And, the Flint River is an interim source of raw water until the Karognondi pipeline is constructed to bring raw Lake Huron water to Flint for treatment.

When you look at the July 2013 Test Run analyses attached, note:

The sample was taken at the Filter Effluent—normally it would be taken at the plant tap, but they were running Flint River water through most of the plant last summer to test treatment, and the filters were the last stop before the clear well/plant tap which were filled with Detroit water they were serving last year. Note: Trihalomethanes (TTHM) are detected, but no exceedances. Detects could be due to: Softening had not been introduced to the treatment process last summer which would reduce the hardness and also remove some of the organic precursor that would add to TTHM levels. Softening is being conducted now in the treatment process. Last summer, chlorine was added in mid-treatment which also could have added to the TTHM level. Now, chlorine is added just before the filters. Also, since it's summer surface water, there will be more run-off, thus more precursor in the raw water. Mike Prysby, the MDEQ District Engineer, believes that today's operation of the plant and quality of drinking water produced is much better than the test runs done over the past year, due to the adjusting of the treatment, such as the softening process and the chlorine application.

Mike received Flint's first Monthly Operation Report (MOR) for the timeframe of April 25-30. Ozone pretreatment is provided to the raw water, and there is ozone destruction at the end of the pretreatment. The Filter Effluent has never been over 0.3 NTU, the ave range is 0.12-0.21 NTU. The chlorine residual at the plant tap is 0.9-1.0 free chlorine. The distribution chlorine residual ranged from 0.7-1.0 of free chlorine, which is acceptable. Bacti samples are pulled every 3-4 hours starting on April 25-30, and all were clear.

CONCLUSION: The analyses show some detects of regulated contaminants, but no exceedances. Thus, we have no report on any regulated contaminant that might be causing rashes, and the complaints we're hearing. I did ask Steve Busch at MDEQ, if there was a possibility of the existence of cyanotoxins from algae on the Flint River. Steve has worked with systems in Southeast Michigan and with Ohio EPA on algae issues, and he didn't think the conditions of the Flint River would support an algae bloom that would cause cyanotoxins to be present.

We would like to know if ATSDR would be interested in looking into this situation, to determine if there are other unregulated contaminants causing complaints of poor water quality.

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Steve Busch: 517-643-2314; buschs@michigan.gov

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Rennaker, Joanne (DEQ)

From: Benzie, Richard (DEQ)
Sent: Tuesday, October 06, 2015 1:16 PM
To: Cook, Pat (DEQ); Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ); Shekter Smith, Liane (DEQ); DeBruyn, Dana (DEQ); Philip, Kris (DEQ)
Subject: FW: Checking In
Attachments: ABC by state memlist.pdf

Here's some information for us to use in developing our sampling protocols for school and for estimating costs of conducting such a program.

Steve and I also contacted the Plumbing Division at DLARA to discuss their possible participation in conducting or assisting with plumbing profiles. According to our contact (Andy), there is no designation for local inspections in Genesee County, so state inspectors would be the ones doing plumbing inspections of schools in Flint. However, the school program was only conferred or transferred to the Plumbing Division about a dozen years ago, so they won't have historical records. But they do have people with knowledge necessary to conduct plumbing assessments that would help establish a sampling protocol for each school should the Governor's office determine the state assume that role. Joe Madziar is our normal contact at DLARA, but he was out of the office until tomorrow.

From: James Taft [<mailto:jtaft@asdwa.org>]
Sent: Tuesday, October 06, 2015 9:34 AM
To: Benzie, Richard (DEQ)
Cc: 'Osterhoudt, Darrell'
Subject: RE: Checking In

Good morning Richard –

States that I believe have been active (at some stage in recent years) in working with their water systems to devise lead sampling programs at schools and/or child care facilities connected to water systems, are as follows:

- **Massachusetts** (Yvette Depeiza) – especially in working with Steve Estes-Smargiassi of the Massachusetts Water Resources Authority (serves Boston); Steve was on the NDWAC LCR workgroup and his contact information is as follows: smargias@mwra.com (617-788-4303)
- **Wisconsin** (Jill Jonas) – in working with Region 5 on some selected communities as part of an EJ project.
- **North Carolina** (Jessica Godreau) – in working with the city of Durham, that had some very high lead levels
- **Rhode Island** (June Swallow) – in working with the city of Providence
- **Washington** (Clark Halvorson) – in working with the city of Seattle

I'd start with Boston and Steve Estes-Smargiassi + Yvette DePeiza, if I had to pick one. Please find the attached member list for contact information for these folks. Also, you've probably seen this, but here's a link to EPA's guidance page for schools and child care facilities where the 3T's material (testing, teaching, telling) is located. 3T's includes recommendations for monitoring for schools.

<http://water.epa.gov/infrastructure/drinkingwater/schools/guidance.cfm>

I hope this is helpful Richard.

Jim Taft
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From: Benzie, Richard (DEQ) [<mailto:BENZIER@michigan.gov>]
Sent: Monday, October 05, 2015 6:59 PM
To: Taft, Jim <jtaft@asdwa.org>
Cc: Shekter Smith, Liane (DEQ) <SHEKTERL@michigan.gov>
Subject: RE: Checking In

Jim,

Biggest firestorm I have experienced in almost 40 years, and to think it is about a water system that has never exceeded an Action Level.

Thank you for the offer of assistance. If you could quickly identify a few states that have actively initiated lead sampling programs at schools &/or child care facilities connected to municipal water systems so that we could learn from their experiences, it would help us right now. We are being tasked with developing a sampling protocol or regimen as well as a cost estimate to implement such a sampling program aimed more at identifying risk from lead exposure in drinking water than at determining SDWA compliance (one liter first draw sampling).

Thanks,
Richard

Richard Benzie, P.E., Chief
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From: Taft, Jim [<mailto:jtaft@asdwa.org>]
Sent: Monday, October 05, 2015 3:29 PM
To: Benzie, Richard (DEQ)
Subject: Checking In

Good afternoon Richard --

We were just curious to know your perspective on the Flint, MI situation, whenever you have a chance (no wish to add to your burden) -- and, of course, please let us know if there's anything we can do to help.

Jim Taft

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NEW YORK

• Mr. Roger Sokol, Director
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 Fax: 701-328-5200

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TEXAS

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VERMONT

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VIRGINIA

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VIRGIN ISLANDS

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WASHINGTON

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WEST VIRGINIA

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WISCONSIN

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WYOMING

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 E-mail: kevin.frederick@wyo.gov

*Wyoming's Drinking Water Program is managed by EPA Region VIII

Rennaker, Joanne (DEQ)

From: Shaler, Karen (DEQ)
Sent: Thursday, November 05, 2015 10:19 AM
To: Sygo, Jim (DEQ); Wurfel, Brad (DEQ); Shekter Smith, Liane (DEQ); Dykema, Linda D. (DHHS); Tommasulo, Karen (DEQ); Busch, Stephen (DEQ); Krisztian, George (DEQ); Thelen, Mary Beth (DEQ)
Subject: FW: Citizen Response - Wayne Koper
Attachments: RE: DHHS Complaint Number? - RE: environmental complaint filed on Oct. 8

FYI, I'm forwarding the DAG's response to the attached online complaint they received from Wayne Koper.

From: Hart, Nancy (AG)
Sent: Thursday, November 05, 2015 10:00 AM
To: Shaler, Karen (DEQ)
Subject: FW: Citizen Response - Wayne Koper

The email has issued (below).

Nancy E. Hart
 Division Head Secretary
 Environment, Natural Resources,
 and Agriculture Division
 525 W. Ottawa Street
 P.O. Box 30755
 Lansing, MI 48909
 (517) 373-7540 phone
 (517) 373-1610 fax

From: Michigan Attorney General
Sent: Thursday, November 05, 2015 9:48 AM
To: wkoper@gmail.com
Subject: Citizen Response

November 5, 2015

Wayne Koper
wkoper@gmail.com
 Citizen Inquiry No. 2015-ep10081942753-A

Attorney General Bill Schuette asked that I respond to your email regarding lead levels in the drinking water in Flint. The Attorney General has been monitoring this situation closely since he became aware of the lead levels in Flint's drinking water, and supports prompt action to ensure Flint residents have a clean and safe drinking water supply.

As I assume you are aware, in the spring of 2014 the City of Flint resumed using the Flint River as its source for drinking water (the City's source prior to the late 1960's). This occurred after the City announced it would be leaving the Detroit water system and getting its water from the (then) yet-to-be-constructed Karegondi Water Authority pipeline, which will bring water directly from Lake Huron. Unfortunately, as many of us have learned over the course of last several weeks, the switch to using water from the Flint River appears to have resulted in lead in drinking water service lines leaching into the drinking water.

Fortunately, steps are now being taken to address that problem. The City will resume receiving water from the Detroit water system until the pipeline from Lake Huron is completed, an action the Attorney General supports. The process began in late October, and I understand the switch back to the Detroit system will be completed within two weeks. In the interim, water filters and lead testing are being provided in the City, free of charge.

At least three reviews or investigations of the actions taken by the City and State are ongoing or planned. The Auditor General is conducting a review of the Department of Environmental Quality's drinking water program. He recently announced that audit will include evaluating the response to the Flint water situation.

Two weeks ago the Governor announced the creation of a Flint Water Task Force. The five members of this task force are from outside government, and include two doctors. Their charge will be to independently review the actions taken in relation to Flint's drinking water crisis, and to provide recommendations to improve practices in the future.

Finally, the U.S. Environmental Protection Agency recently announced it is conducting a review of the response to the Flint water situation.

On behalf of Attorney General Bill Schuette, thank you for taking the time to share your concerns with our office.

S. Peter Manning
Division Chief
Environment, Natural Resources,
and Agriculture Division

Web Complaint No: 2015-ep10081942753-A Submitted: 10/8/2015 7:42:07 PM

Governor Rick Snyder and other Michigan elected/appointed officials have undeniably poisoned the children of Flint MI with water containing unsafe levels of the heavy metal lead causing irreversible damage to the health of these children and must be held criminally responsible for the severe damage inflicted. Immediate abatement of any and all known threat should be of paramount importance, anything less fails the citizens facing this lifelong threat.

Rennaker, Joanne (DEQ)

From: Shaler, Karen (DEQ)
Sent: Wednesday, October 14, 2015 5:53 PM
To: Sygo, Jim (DEQ); Wurfel, Brad (DEQ); Shekter Smith, Liane (DEQ); Dykema, Linda D. (DHHS); Tommasulo, Karen (DEQ); Busch, Stephen (DEQ); Krisztian, George (DEQ)
Cc: Thelen, Mary Beth (DEQ)
Subject: RE: DHHS Complaint Number? - RE: environmental complaint filed on Oct. 8
Attachments: Environmental Incident Report Form.pdf

FYI, Peter Manning hand carried to me this afternoon the attached Environmental Incident Report Form that was submitted online to, and subsequently faxed to, DAG's ENRA Division.

From: Shaler, Karen (DEQ)
Sent: Wednesday, October 14, 2015 11:32 AM
To: Sygo, Jim (DEQ); Wurfel, Brad (DEQ); Shekter Smith, Liane (DEQ); Dykema, Linda D. (DHHS); Tommasulo, Karen (DEQ); Busch, Stephen (DEQ); Krisztian, George (DEQ)
Cc: Thelen, Mary Beth (DEQ)
Subject: RE: DHHS Complaint Number? - RE: environmental complaint filed on Oct. 8

The mystery is solved!

I'm covering Executive Division's main phone line this morning, and I received a call from Wayne Koper (a citizen from the Thumb area) who said he faxed to 373-1610 an Environmental Incident Report Form (a DAG form) regarding "poisoning of children of Flint." He said the complaint number assigned to it is: 2015-ep10081942753-A. I checked online and found out that fax number is for the DAG's Environment, Natural Resources, and Agriculture Division.

I then spoke with Peter Manning's secretary, Nancy Hart, to see if they received his form and to let her know I'd be e-mailing her a phone message from Mr. Koper to return his call. She said they have the form, and she will ask Peter if it's OK to forward a copy to me to share with you. Stay tuned.....

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, October 14, 2015 8:22 AM
To: Shekter Smith, Liane (DEQ)
Cc: Tommasulo, Karen (DEQ); Sygo, Jim (DEQ); Shaler, Karen (DEQ); Busch, Stephen (DEQ); Wurfel, Brad (DEQ)
Subject: RE: DHHS Complaint Number? - RE: environmental complaint filed on Oct. 8

The number does not look familiar to me, but it could be related to 1 of 2 pending legal actions in Kalamazoo that HHS is involved in that are unrelated to drinking water issues. Both actions pertain to lead abatement activities and/or contractor compliance with the regulations.

From: Shekter Smith, Liane (DEQ)
Sent: Tuesday, October 13, 2015 5:16 PM
To: Dykema, Linda D. (DHHS)
Cc: Tommasulo, Karen (DEQ); Sygo, Jim (DEQ); Shaler, Karen (DEQ); Busch, Stephen (DEQ); Wurfel, Brad (DEQ)
Subject: RE: DHHS Complaint Number? - RE: environmental complaint filed on Oct. 8

Linda – does this look familiar to you? We're having trouble figuring out what this is referring to.

If not – any suggestions on who else we should check with?

From: Shaler, Karen (DEQ)
Sent: Tuesday, October 13, 2015 4:48 PM
To: Shekter Smith, Liane (DEQ); Wurfel, Brad (DEQ); Busch, Stephen (DEQ)
Cc: Tommasulo, Karen (DEQ); Sygo, Jim (DEQ)
Subject: DHHS Complaint Number? - RE: environmental complaint filed on Oct. 8

Someone may want to check with Linda Dykema, DHHS, to see if this is their complaint number.

From: Shekter Smith, Liane (DEQ)
Sent: Tuesday, October 13, 2015 2:47 PM
To: Wurfel, Brad (DEQ); Busch, Stephen (DEQ)
Cc: Tommasulo, Karen (DEQ); Sygo, Jim (DEQ); Shaler, Karen (DEQ)
Subject: RE: environmental complaint filed on Oct. 8

Is this the complaint Karen Shaler was trying to track down earlier?

From: Wurfel, Brad (DEQ)
Sent: Tuesday, October 13, 2015 2:45 PM
To: Busch, Stephen (DEQ); Shekter Smith, Liane (DEQ)
Cc: Tommasulo, Karen (DEQ); Sygo, Jim (DEQ)
Subject: FW: environmental complaint filed on Oct. 8

An anonymous caller is hitting up all the media to look into this complaint.

Who can dig it out and get me a copy asap?

Thanks.

b

From: Lynch, James [<mailto:JLynch@detroitnews.com>]
Sent: Tuesday, October 13, 2015 1:21 PM
To: Wurfel, Brad (DEQ)
Cc: Tommasulo, Karen (DEQ)
Subject: environmental complaint filed on Oct. 8

Complaint number is, supposedly.....

2015-ep10081942753-a

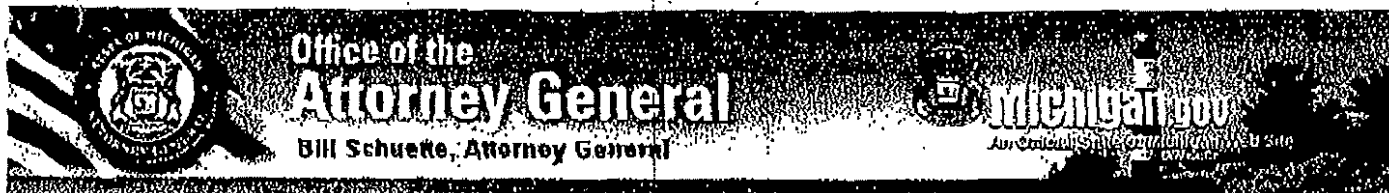
10/13/2015 10:46

9896734777

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PAGE 01/02

Michigan State Complaint Report Form



Michigan.gov Home

AG Home | Site Map

ENVIRONMENTAL INCIDENT REPORT FORM

Your complaint has been successfully submitted. Please print and/or save this confirmation for your records.

If you need to reference your complaint, or supply additional information and/or documents in support of your complaint by Email, facsimile or postal mail, refer to your complaint with the following Complaint Identification Number: 2015-ep10081942753-A

- Email;
- Fax: (517) 373-1610
- Mail: P.O. Box 30765, Lansing, MI 48909

Dept. of Attorney General
RECEIVED

OCT 14 2015

Web Complaint Number: 2015-ep10081942753-A

Submitted: 10/8/2015 7:42:07 PM

NATURAL RESOURCES
DIVISION

Complainant Information

☐ Check if you prefer to submit this complaint anonymously

Your Last Name: Koper
Your Street Address: 425 N. Grand Rd
Your State: MI
Your County: Tuscola
Your Home Phone: 9893256113
Fax Number:

First Name: Wayne
City: Caro
Zip Code: 48723

M.I.: A

Your Work Phone:
E-mail Address: wkoper@gmail.com

Ext.:

Information On Company Or Person Your Complaint Is About

Company or Person? Person
Complainee Last Name: Snyder
Company Name:
Street Address: P.O. Box 30013
State: MI
County: Eaton
Fax Number: 5173356863
Web Site Address:

Complainee First Name: Rick

City: Lansing
Zip Code: 48909
Phone: 5173733400
E-mail Address: rick.snyder@michigan.gov

Incident Information

Incident Date:
Incident Location: Flint, MI
City or Township: Flint
County: Genesee

Incident Time: 1:00:00 AM
Zip Code:
Lake/Stream:

Other Information

Is a court action pending?
Do you have an attorney representing you on this matter?
Are you willing to testify in court regarding this complaint?
Did you complain directly to the business?
What was the response from the business?
If no complaint was given to the business directly, why?

☐ Yes ☐ No

If so, who?

Yes ☐ No
Yes ☐ No
Yes ☐ No
Governor Snyder
Indignation

Was this complaint filed with any other agencies?

Yes ☐ No ☐

If so, who?

CPS

Incident Detail

Describe your problem, what attempts you have made to correct it, and how you would like to have the problem resolved. You have approximately 8-10 typed pages and you may paste text from word processing documents.

Governor Rick Snyder and other Michigan elected/appointed officials have undeniably poisoned the children of Flint MI with water containing unsafe levels of the heavy metal lead causing irreversible damage to the health of these children and must be held criminally responsible for the severe damage inflicted. Immediate abatement of any and all known threats should be of paramount importance, anything less fails the citizens facing this lifelong threat.

- ☐ Check if this referral is just to give us information and you do not need us to respond to you directly.
- ☐ Check if you want to send documentation. After you submit this form you will be provided with a postal mail address, and facsimile number, to which you may send documents.
- ☐ Check if you want to sign up for the Consumer Protection Listserv.
- ☐ Check if you want to sign up for the AG Press Release Listserv.
- ☐ Check if you want to sign up for the Attorney General Opinions Listserv.

☐ I certify that the information on this form is true and accurate to the best of my knowledge.

☐ I consent to releasing to the Michigan Attorney General any information or document relative to the investigation of this complaint. By checking this box, I also certify that I have had the opportunity to review the Michigan Attorney General Privacy Policy before submitting this complaint.

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[Privacy Policy](#) | [Link Policy](#) | [Accessibility Policy](#) | [Security Policy](#) | [AG Privacy Policy](#) | [AG Web Disclaimer](#) | [Michigan News](#) | [Michigan.gov Survey](#)

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Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Monday, May 04, 2015 12:16 PM
To: Busch, Stephen (DEQ)
Subject: FW: City of Flint - April Bromate Results
Attachments: April 2015 Bromate Results.pdf

Steve,

Flint's April 2015 Bromate result – non-detect lets get a few more of these....

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

From: Michael Glasgow [<mailto:mglasgow@cityofflint.com>]
Sent: Monday, May 04, 2015 8:33 AM
To: Prysby, Mike (DEQ); Rosenthal, Adam (DEQ)
Subject: City of Flint - April Bromate Results

Gentleman,

Here is the bromate test result for April 2015.

Mike

**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	30-APR-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-00173938		
Project Number	10005233 (CL04)		
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 A. LeVanseler
 Kerri Levanseler - Director, Chemistry Laboratory

Date 30-APR-2015

**General Information**

Standard: USFDA CFR Title 21 Part 165.110

Date and Time Sampled: 4/20/2015 08:10 EDT

Product Description: Municipal Water

Test Description: Bromate - April 2015

Sample Id: S-0001148608

Description: Municipal Water - 4/20/2015 08:10 EDT

Sampled Date: 04/20/2015

Received Date: 04/21/2015

Testing Parameter	Reporting Limit	Result	FDA SOQ	Units	P / F
Disinfection Residuals/Disinfection By-Products					
Bromate	10	ND	10	ug/L	Pass



<<Additional Information>>

Sample Id: S-0001148608

Test Parameter	Date Analyzed	Time Analyzed	Date Prepared/ Processed
Disinfection Residuals/Disinfection By-Products			
Bromate (Ref: EPA 300.1)	21-APR-2015		


Testing Laboratories:

Flag	Id	Address
All work performed at: (Unless otherwise specified)	NSF_AA	NSF International 789 N. Dixboro Road 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/enevs/documents/minimum_detection_level_spreadsheet.pdf.

Rennaker, Joanne (DEQ)

From: Thelen, Mary Beth (DEQ)
Sent: Wednesday, October 01, 2014 11:58 AM
To: Busch, Stephen (DEQ)
Cc: Shekter Smith, Liane (DEQ); Willard, Veronica (DEQ)
Subject: FW: CITY OF FLINT DRINKING WATER, GOVERNOR'S OFFICE BRIEFING PAPER
Attachments: Governor Briefing - City of Flint 10-1-14.docx; Governor Briefing - City of Flint 10-1-14.pdf; Flint Monthly Pumpage Comparison.pdf; ODWMA-399-022.pdf

Importance: High

Hi Stephen,

Here is the note and final version we sent to the Governor's office today.

Thanks Stephen for preparing! We just tweaked the briefing slightly before sending it out with headers, title, etc. You may want to replace your version with this one.

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

From: Thelen, Mary Beth (DEQ)
Sent: Wednesday, October 01, 2014 11:19 AM
To: Scott, Allison (GOV); Muchmore, Dennis (GOV); Brader, Valerie (GOV)
Cc: Wurfel, Brad (DEQ); Wyant, Dan (DEQ); Datema, Maggie (DEQ); Sygo, Jim (DEQ); Wisniewski, Wendy (GOV); West, Samantha (GOV)
Subject: CITY OF FLINT DRINKING WATER, GOVERNOR'S OFFICE BRIEFING PAPER
Importance: High

Dear Governor, Dennis, and Val:

Per your request, the attached briefing paper is on the City of Flint drinking water situation. Director Dan Wyant has asked that I send this to you. A Word version as well as a pdf version is attached. We have also included a copy of the policy ODWMA-399-022 which specifically provides guidance regarding boil water advisory situations, and a chart showing the significant increase in the City of Flint's water demands following the extreme conditions experienced this past winter.

Allison, please forward to the Governor. Thank you.

If you have any questions or need further information, please let us know. Thank 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

Attachments

DEPARTMENT OF ENVIRONMENTAL QUALITY

GOVERNOR'S OFFICE BRIEFING PAPER CITY OF FLINT DRINKING WATER

What contributed to the Boil Water Advisories in the city of Flint?

A number of factors, not one specific cause, likely contributed to the Boil Water Advisories (BWAs) in the city of Flint during August and September 2014. While use of the Flint River has increased the amount of natural organic matter in the city's water, the Flint Water Treatment Plant (WTP) has performed well above treatment requirements for organic carbon removal. In addition, less than 20 percent of the water system was included in the advisory area. If treatment had been compromised, detections would have been widespread throughout the city, rather than in such a localized area.

The city's water distribution system has suffered from a lack of infrastructure investment and asset management. Most of the city's over 550 miles of water mains are now over 75 years old and constructed of cast iron piping. Cast iron pipe is subject to internal corrosion, called tuberculation, which causes buildup on the pipe interior, leading to water quality issues, reduced flow and pressures, and leakage. Tuberculation also encourages the development of biofilms, layers of bacteria that attach to the interior pipe wall. Biofilm growth is common in areas of piping with little or no disinfectant residual, and together with tuberculation can clog water lines to the point of insufficient water pressure.

The city has also experienced decades of a declining user base and water use associated with vacant homes, commercial businesses, and industrial property. Declining water use leads to excess residence time within the city's distribution pipes and water storage facilities, accelerating tuberculation, biofilm growth, and disinfectant residual degradation. While the city has recently seen an infusion of funding for blight removal, contractors completing this work have been improperly using fire hydrants, causing hydraulic disturbances that dislodged and suspended settled debris, which may have contributed to the bacterial contamination.

The winter of 2014 was also one of the coldest experienced by the water system. The city, which historically has unaccounted water losses of over 30 percent, has seen even greater losses since February 2014 due to an increase in cold weather-related water main breaks and leaks. The city lacks a formal maintenance program for its over 7,250 valves, which would normally be used to limit impacts during break repairs. Two valves on the transmission line used to supply the area of the BWAs were found to be closed during the city's investigation, causing longer residence time, reduced disinfectant residual, reduced flow, and reduced pressure. One of these valves has remained broken.

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The BWAs also occurred during the warmest and, for 2014, relatively wet periods of August and September. Warm weather conditions are not only more conducive to bacterial growth but also degrade the water's disinfectant residual carried out from the WTP more quickly. Longer residence times, biofilms, and tuberculation also contribute to disinfectant residual degradation. Warm wet weather conditions also allow water contaminated with bacteria to pool around piping with leaks and breaks.

Process for Issuance and Cancelation of a Boil Water Advisory

There are a number of conditions that can trigger BWAs. This includes the following:

- Bacteria Monitoring Detections
- Bacteria Standards Violations
- Treatment System Failures
- Waterborne Disease Outbreaks
- Loss of System Pressure
- Water Main Breaks
- Other Interruptions in Service

The Department of Environmental Quality (DEQ) has developed a policy and procedure regarding BWAs to help guide staff, provide consistency, and maintain public health. A PDF of Policy and Procedure No. ODWMA-399-022 is being forwarded with this briefing paper.

BWAs may be self-initiated by the water system, issued collaboratively in consultation with the DEQ, or when necessary mandated by the DEQ. Requesting customers to boil the water when bacterial contamination has occurred provides an added barrier of public health protection.

The BWAs that recently occurred in the city of Flint were associated with bacteria monitoring detections and violations of bacteria standards. These advisories were issued by the city of Flint collaboratively in consultation with the DEQ.

Current regulations regarding monitoring and standards for bacteria in water distribution systems were developed by the U.S. Environmental Protection Agency, have been in effect since 1990, and were incorporated into the Michigan Safe Drinking Water Act, 1976 PA 399, as amended. There are a variety of bacteria, parasites, and viruses that can potentially cause health problems if humans ingest them in drinking water. Testing water for each of these potential pathogens would be difficult and expensive. Instead, water systems test for total coliform and *E.coli*. Total coliform bacteria react to water treatment in a manner similar to many pathogens. Therefore, the presence of total coliform in drinking water indicates there may be a pathway for pathogens or other contaminants to enter the system. The absence of total coliforms in the distribution system minimizes the likelihood that pathogens are present. *E.coli* is itself a pathogen, and its detection would be direct evidence of a health risk.

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Once a BWA has been issued, time is needed to investigate potential causes and implement corrective measures. The larger the water system, the more time this may take. Once corrective measures have been taken, samples must be collected and analyzed to confirm that bacteria are no longer present. Using the most common analytical method, samples must be incubated for a period of 24 hours before results can be obtained. In situations where the bacterial contamination has been confirmed, two consecutive rounds of safe samples collected at least 24 hours apart are normally obtained before canceling a BWA. Adding each of these steps together, a normal response period to cancel a BWA under these circumstances would be expected to take at least 3 to 4 days.

Recent History of the City of Flint Water System

Historically, the city of Flint had been a customer of the Detroit Water and Sewerage Department (DWSD) while simultaneously maintaining the Flint WTP to provide emergency backup service using the Flint River. The WTP performed quarterly test operations to maintain readiness and was utilized twice in 2009, supplying water once for 2 days and the other for 3 days.

In April 2013 the city of Flint notified the DWSD that it would be terminating service in the future and contracting for raw water service from the Karegnondi Water Authority (KWA). Work on the KWA pipeline from Lake Huron broke ground in June 2013 and is expected to be completed with connection in late 2016.

In August 2013 Rowe Professional Services Company completed an engineering proposal for improvements to the Flint WTP that would allow continuous operation of the WTP utilizing the Flint River in lieu of continuing service from the DWSD until completion of the KWA pipeline. In March 2014 the city of Flint entered into a Consent Agreement with the DEQ regarding the Flint WTP's lime sludge facility. In April 2014 the DEQ issued a construction permit for improvements to the Flint WTP. On April 25, 2014, the city of Flint began continuous operation of the WTP, using water from the Flint River and discontinued the purchase of water from the DWSD.

A BWA was issued for August 15-20, 2014, for a portion of the city of Flint due to localized detections of total coliform and *E.coli* bacteria. Another BWA was issued for September 5-9, 2014, due to localized detections of total coliform bacteria in the same and adjacent portions of the city of Flint. The advisory covered an area of approximately six square miles. The city of Flint has a total land area of just over 34 square miles.

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While many of the BWA contributing factors listed above require long-term solutions, the city has taken operational steps to limit the potential for a BWA to reoccur. The city has increased flushing of water mains to limit residence time, maintain disinfectant residual, and help remove buildup and deposits within the piping. The city is boosting chlorine disinfectant residual at locations in the distribution system as needed. The city continues to investigate water leaks and water main breaks and the status and condition of system valves.

Prepared by: Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
Department of Environmental Quality
October 1, 2014

DEPARTMENT OF ENVIRONMENTAL QUALITY

GOVERNOR'S OFFICE BRIEFING PAPER CITY OF FLINT DRINKING WATER

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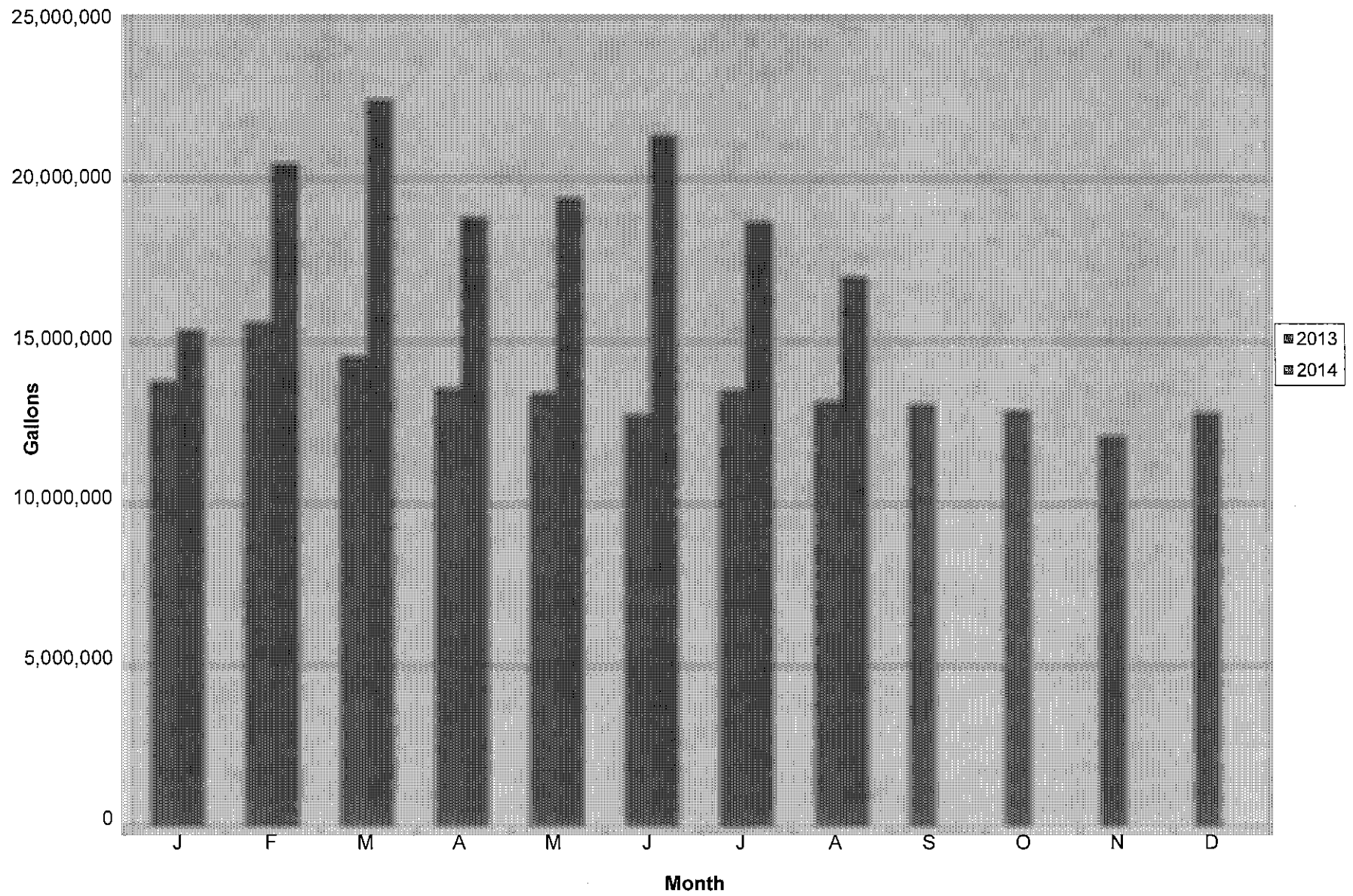
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Prepared by: Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
Department of Environmental Quality
October 1, 2014

City of Flint Monthly Averages



	OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE POLICY AND PROCEDURE		DEPARTMENT OF ENVIRONMENTAL QUALITY
Original Effective Date: October 12, 2007	Subject: Guidelines for Issuing Boil Water Advisories to Address Potential Microbial Contamination of Community Water Supplies		Category: ☐ Internal/Administrative ☐ External/Noninterpretive
Revised Date:	Division/Office and Program Names: ODWMA-Public Water System Supervision Program		☒ External/Interpretive
Reformatted Date: January 24, 2013	Number: ODWMA-399-022	Page: 1 of 10	

A Department of Environmental Quality (DEQ) Policy and Procedure cannot establish regulatory requirements for parties outside of the DEQ. This document provides direction to DEQ staff regarding the implementation of rules and laws administered by the DEQ. It is merely explanatory; does not affect the rights of, or procedures and practices available to, the public; and does not have the force and effect of law.

INTRODUCTION, PURPOSE, OR ISSUE:

Community water systems are expected to provide customers with a continuous supply of water that meets both federal and state drinking water standards. However, there may be circumstances when the public must be notified that the water may not be safe. In these circumstances, a boil water advisory may be issued to prevent illness from known or suspected microbiological contamination. This policy is to provide guidance to Office of Drinking Water and Municipal Assistance (ODWMA) drinking water program staff on advising community water system personnel when to issue and rescind a boil water advisory, the appropriate content, and the manner and method of delivery.

AUTHORITY:

Administrative rule R 325.10401a promulgated under the Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), being Michigan Compiled Law 325.1001 *et seq.*, requires public notification for violations of maximum contaminant levels and treatment techniques plus other situations as determined by the DEQ. Each public notice is required to state what actions consumers should take during a violation, which may include a statement recommending water customers boil all water used for consumption until further notice.

In addition, R 325.11207 allows the DEQ to require the supplier of water to provide notice to customers or users that include any precautionary measures deemed necessary when an interruption in water service occurs, which could include low, zero, or negative pressure events.

Furthermore, R 325.12303 requires a supplier of water to include in their contingency planning a description of precautions or measures to be taken to protect the health of those customers or users that may be affected by an emergency. R 325.12304 also requires a supplier of water to notify the DEQ when an emergency is discovered and how the supply will notify its customers or users. While the content of this notification to customers or users may vary depending upon individual circumstances, each notification to customers or users must state what actions or precautions they should take, which may include a statement to boil all water used for consumption until further notice.

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STAKEHOLDER INVOLVEMENT:

DEQ staff met with Municipal Utilities Directors to seek input on issues that were subsequently addressed in this policy and procedure.

DEFINITIONS:

"Boil Water Advisory (BWA)" – A written or verbal advisory issued by the community water system or DEQ notifying the users of the water system that the water is or may be contaminated and advising them to boil the water prior to using it for drinking or cooking.

"Community Water Supply (CWS)" – A public water supply (PWS) that provides year-round service to not fewer than 15 living units, or that regularly provides year-round service to not fewer than 25 residents. Examples include municipalities, such as cities, villages, and townships; apartment complexes; manufactured housing communities; condominiums; and nursing homes.

"Complete Loss of Pressure" – Sustained negative pressures or pressure below five psi in any portion of a distribution system. It does not include instantaneous low or negative pressure occurring from pressure surges caused by pump cycling, valve operation, or other water hammer events.

"Maximum Contaminant Level (MCL)" – The maximum permissible level of a contaminant in water that is delivered to any user of a PWS.

"Repeat Sample" – A sample that is collected and analyzed in response to a previous coliform-positive sample.

"Routine Sample" – A water sample that is collected and analyzed to meet the monitoring requirements for total coliform, as outlined in the written sampling plan.

"Tier 1 Public Notice" – A public notice required to be provided as soon as practical but not later than 24 hours after the supplier learns of a violation or situation that has significant potential to have serious adverse effects on human health as a result of short-term exposure. A Tier 1 Public Notice also requires the supplier to initiate consultation with the DEQ as soon as practical but not later than 24 hours after the supplier learns of the violation or situation. Examples of these violations or situations include:

1. A violation of the Total Coliform MCL when fecal or *E.coli* are present in the distribution system;
2. A violation of the treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit;
3. An occurrence of a waterborne disease outbreak;
4. A failure or significant interruption in key water treatment processes;
5. A disruption of the water supply or distribution system; and

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6. Other violations or situations as determined by the DEQ on a case-by-case basis. A violation or situation that requires a Tier 1 Public Notice also requires the supplier to consult with the DEQ to determine additional public notice requirements, including the timing, form, manner, frequency and content of the notice designed to reach all persons served, and any repeat notices or directions. At a minimum, one or more of the following forms of delivery must be used:
- a. Appropriate broadcast media;
 - b. Posting of the notice in conspicuous locations throughout the area served by the system;
 - c. Hand delivery of the notice to persons served by the system; or
 - d. Another delivery method approved by the DEQ.

Within 10 days of completing the Tier 1 Public Notice, the supplier shall submit to the DEQ a certification that it fully complied with the public notification requirements, including a representative copy of the type of notice distributed to persons served by the system and to the media.

"Tier 2 Public Notice" – A public notice required to be provided as soon as practical but not later than 30 days after the supplier learns of a violation or situation that has the potential to have serious adverse effects on human health. Examples of these violations or situations include:

1. All violations of MCL, maximum residual disinfectant level, and treatment technique requirements except where the DEQ determines a Tier 1 notice is required.
2. Violations of monitoring and testing procedure requirements, taking into account potential health impacts and persistence of the violation; and
3. Failure to comply with a variance or exemption.

For a Tier 2 Public Notice, the DEQ may, on a case-by-case basis, grant extensions in writing for up to three months from the date the supplier learns of the violation or situation, for reasons such as coordinating with billing cycles or if the violation or situation was quickly resolved and no longer poses any risk to the persons served. A Tier 2 Public Notice shall be repeated every three months as long as the violation or situation exists. A Tier 2 Public Notice and any repeat notices shall be in a form and issued in a manner that is reasonably calculated to reach persons served in the required time period. At a minimum, the notice shall be provided:

1. By mail or direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the supplier, and
2. By other methods reasonably calculated to reach other persons not receiving a bill, such as apartment dwellers, university students, nursing home patients and prison inmates. Other methods may include:
 - a. Publication in a local newspaper
 - b. Delivery of multiple copies to apartment complexes and manufactured housing communities
 - c. Posting in public places or on the Internet
 - d. Delivery to community organizations

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"Treatment Technique (TT)" – Minimum treatment requirement or a necessary methodology or technology that is employed by a supplier of water for the control of the chemical, physical, biological, or radiological characteristics of a PWS.

POLICY:

A BWA may be issued for a variety of reasons when microbial contamination is known or suspected. Total Coliform Rule (TCR) MCL violations, surface water TT violations, low or loss of pressure events, and waterborne disease outbreaks are circumstances when a BWA may be issued. Each of these situations is discussed in detail below. However, these situations are not the only times a BWA can or should be issued. Each incident must be handled on a case-by-case basis, using professional judgment to evaluate the circumstances in each situation.

Finally, there may be situations when water systems experience contamination that is not microbial, but chemical due to a chemical spill or backflow due to a cross connection. In these cases, a notice to customers could include "Do Not Use" language since boiling the water may not remove the contamination.

Types of Incidents:

1. Violation of a Drinking Water Standard

a. TCR MCL Violations

An acute TCR MCL violation occurs when monitoring indicates the presence of coliform organisms in both a routine and a follow-up repeat sample in the same monitoring period, and either analysis (routine or repeat) is also positive for fecal or *E.coli*. Because this MCL violation confirms the presence of a more direct connection to contamination, these violations warrant issuance of a BWA, unless there are unique circumstances.

A non-acute TCR MCL violation occurs when monitoring indicates the presence of coliform bacteria in 2 or more samples in the same monitoring period for a supplier collecting less than 40 samples per month, or in more than 5 percent of the samples for a supplier collecting 40 or more samples per month, and the criteria for an acute violation did not occur, i.e., fecal coliform or *E.coli* were NOT detected present in either a routine or repeat sample. For example, a system that collects 5 samples per week for a total of 20 per month may have 1 sample report positive for total coliform or fecal/*E.coli* during the first week, but all repeat samples report negative for coliform. If another sample in a subsequent week also reports total or fecal/*E.coli* positive, but again, all repeat samples are coliform-negative, then a non-acute TCR MCL violation has occurred because 2 or more samples reported positive for coliform, but no fecal coliform or *E.coli* were detected in both a routine and a repeat sample.

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When a non-acute violation occurs, staff should evaluate possible sources of contamination. If a source is identified that is considered likely to contribute disease causing organisms or result in water of questionable quality still being distributed, a BWA should be instituted. Examples of contaminant sources that would elevate the public health risk include, but are not limited to:

- flooding of the wells
- failure of the treatment system
- recent construction activity in the distribution system
- vermin (birds, rodents, etc.) activity in storage tanks
- system-wide or extensive pressure loss in the distribution system

Even if the source of contamination is not easily identified, a BWA may be appropriate for a non-acute TCR violation if the violation is widespread or ongoing. A BWA shall be instituted if monitoring indicates *E. coli* or fecal coliform contamination unless unusual circumstances warrant consideration, such as the absence of any coliform in repeat samples, or when staff are assured that the contamination has been eliminated before confirmation results are available.

However, not every TCR MCL violation must result in a BWA. There may be a few exceptions when there is a TCR MCL violation but a BWA is not needed. For example, a violation may be declared in situations where samples collected on different days from widely dispersed locations report coliform present even though repeat samples do not show positive results. In this case, the sampling results may constitute a MCL violation, but a BWA may not be necessary.

If a BWA is deemed necessary by the ODWMA, it should be issued as soon as possible but no later than 24 hours after the system learns of the violation. Because violation of an MCL results in required public notification (PN) per the PN Rule, the water supply may issue the PN and BWA simultaneously in one document (highly recommended) and must meet all the requirements of a Tier 1 PN and include BWA language.

After measures have been taken to eliminate the source(s) of contamination, such as initiating or increasing chlorine feed rates and system flushing, additional sampling must be conducted. Raw water bacteriological sampling is also encouraged to eliminate the raw water as the possible source of contamination. For MCL violations, the BWA can be rescinded after the analyses of two sets of samples collected 24 hours apart report the absence of coliform bacteria. The number of samples in each set should be a minimum of five samples, but can be decreased or increased based on system size or the extent of the affected area. Systems are encouraged to use routine sample sites if available and to use extra care if routine sites are not available.

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b. Surface Water Treatment Rule (SWTR) TT Violations

SWTR TT violations include:

- exceedance of turbidity standards at filter confluence point
- failure to meet disinfection contact time requirements (C*T)
- failure to meet disinfection residual standards

Upon determination of an SWTR TT violation, ODWMA staff must determine if the violation poses a threat to public health. For example, if the turbidity levels at the filter confluence point were found to have exceeded 0.3 nephelometric turbidity units (NTUs) in 95 percent of the samples in a two-month period, an SWTR TT violation has occurred. Based upon a review of plant performance and consultation with program managers, staff may determine that no significant health risk was posed and no BWA is necessary. However, the water supply must still issue a Tier 2 PN within 30 days of the violation. On the other hand, a BWA is likely to be necessary for a treatment plant that gets overwhelmed by excessive runoff and reports a turbidity level in excess of 1.0 NTU at the filter confluence point for a four-hour period.

If the TT violation is ongoing or prolonged, or the ODWMA determines a significant public health risk is posed, ODWMA staff may elevate the PN to Tier 1 status, which must be issued within 24 hours and include BWA language. After appropriate measures have been taken to reduce or eliminate any health risk, additional monitoring must be conducted. Appropriate measures may include increasing coagulant dose, increasing chlorine residuals through the treatment plant, backwashing filters more often and flushing key system components. In this case, a BWA can be rescinded after analyses of two sets of samples collected 24 hours apart report the absence of coliform bacteria. The number of samples in each set should be a minimum of five samples, but can be decreased or increased based on type and severity of the TT violation.

Surface water plants utilizing conventional or direct filtration must add a primary coagulant under R 325.11008. Failure to add a primary coagulant is a violation of Act 399, and may also contribute to a TT violation under R 325.10611 (Filtration and Disinfection) which requires 3-log inactivation of giardia and 4-log inactivation of viruses. In these cases, ODWMA staff will have to determine if the violation poses a threat to public health and whether other actions are necessary, such as requiring a BWA. Factors to consider if a BWA is necessary would include chlorine residual concentrations throughout the treatment plant, raw water quality, C*T compliance, plus individual filter effluent and combined filter effluent turbidity levels.

2. Waterborne Disease Outbreaks

Waterborne disease outbreaks can be declared by the Centers for Disease Control and Prevention, the Department of Community Health, a local health department, or other public

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health institutions. If an outbreak is declared, the ODWMA will work with the declaring agency to ensure affected community public water supplies take appropriate measures to mitigate public exposure. These measures will include appropriate public notification, including instructions to boil water if appropriate. The ODWMA will allow the water supply to rescind the notification when the agency declaring the outbreak indicates it is safe to do so as the result of additional monitoring.

3. Interruptions in Service

a. Negative or Complete Loss of Pressure

A complete loss of pressure or negative pressure in the distribution system must result in a BWA being issued to all water customers in the impacted area. After pressure is restored and the system recovers (tanks are filling and enough sources are operating to ensure pressures do not drop again), the affected area should be thoroughly flushed and coliform samples must be taken throughout the area to determine if the distribution system remains free of coliform contamination. The number of samples will vary depending on the size of the system and the extent of the area impacted. For very small systems that experience a power failure that results in a complete loss of pressure throughout the distribution system, a minimum of three samples should be collected. If applicable, chlorine residual measurements should be taken to ensure that an adequate disinfectant residual is present. If possible, chlorine dosages and residuals should be increased by 1 to 2 parts per million during this period as a corrective and preventive measure. If the first round of sampling does not detect coliform bacteria, the advisory may be rescinded. However, if the first round of sampling detects coliform bacteria, additional flushing should be conducted in the area where the positive coliform samples were collected and a second round of coliform samples collected from the area. The BWA should remain in effect until safe coliform sample results are obtained.

b. Low Pressure Events

Low pressure events might not result in a BWA. Low pressure is considered a drop in pressure below 20 psi but greater than 5 psi. A drop in water pressure in a distribution system could allow contamination to enter the water system through backflow by backpressure or backsiphonage. The decision to issue a BWA should be made on a case-by-case basis and be based upon professional judgment of all available data that may indicate the extent of the problem, such as:

- Geographical extent of the pressure loss
- Nature of the service area (residential vs. commercial/industrial)
- Duration of the low pressure condition
- Disinfection practices of the water system
- Relative elevation differences in the service area
- Status of the local cross connection control program

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- Age and condition of the underground piping
- Amount of underground piping located in areas of a high groundwater table
- Ability and willingness of the operators to rapidly apply chlorine to the system or distribute an increased chlorine residual throughout the affected area

After normal pressure is restored, the impacted area should be thoroughly flushed and coliform samples taken throughout the area to determine if the distribution system is free of any bacteriological contamination. The collection of coliform samples after low pressure events is not absolutely required, but may be recommended based on the factors above.

c. Water Main Breaks or Repairs

A BWA may be issued during water main breaks and after the break has been repaired. Whether or not to issue a BWA will depend on the location and severity of the break and, more importantly, a decision based on sound engineering judgment that the integrity of the water system has been maintained. If at all possible, repairs should be performed under reduced or low pressure by closing the closest valves on each side of the break just enough to reduce the flow so the repairs can be made under pressure while the water flowing from the break is diverted away from the excavation to maintain clean sanitary conditions. If the water main can be repaired under pressure, and no nonpotable water, soil, or other potential contaminants entered the main during the break and repair process, then a BWA is not necessary. If the water main that was removed from service is flushed, disinfected, and sampled in accordance with AWWA Standard C651 before being placed back into service, a BWA does not need to be issued.

If a water main break results in a complete loss of pressure before, during, or after the repair is made, a BWA must be issued to all customers in the affected area. The BWA should remain in effect until the area is flushed, chlorine residuals are reestablished (if applicable), and sample results do not detect coliform bacteria.

Content and Delivery of a BWA

If the ODWMA determines a BWA is necessary, the water supply must issue the advisory as soon as practical, but not later than 24 hours after being advised to do so. The supply must make a good faith attempt to notify all customers in the affected area. Appropriate methods of distribution are situation specific, but may include radio or television broadcasts, hand delivery, and/or posting in conspicuous locations throughout the area. Delivery requirements as detailed in the PN Rule should be used to determine appropriate delivery methods.

Although there are content requirements for public notification under the PN Rule, there are no requirements specific to boil water language. To ensure all appropriate information is transmitted to the customers, a BWA should include the same content elements as required for

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public notification under the PN Rule. If a BWA is issued as the result of an MCL violation and the water supply issues the BWA in conjunction with the required PN (highly recommended), the content **MUST** meet all PN Rule content, delivery, and reporting requirements.

The ODWMA boil water language is consistent with the U.S. Environmental Protection Agency policy that requires water be brought to a boil and allowed to boil for one minute before use. The language also suggests the use of bottled water as an alternative to boiling and describes the circumstances under which boiled or bottled water should be used.

Staff should notify the appropriate local health department and the Department of Agriculture and Rural Development, Food and Dairy Division, whenever a BWA is issued or rescinded. These agencies may receive calls from concerned customers or be involved in oversight of facilities impacted by the boil advisory and, therefore, need to be aware of the situation.

Several BWA templates have been created and are available to ODWMA staff on the DEQ Intranet. To ensure consistency and inclusion of all necessary content, these templates should be used as the basis for PNs and/or a BWA. Available templates include, but are not limited to:

- Advisory for a TCR MCL.
- Advisory for a low/no pressure event.
- Notification for cancellation of a BWA.

PROCEDURES:

WHO	DOES WHAT
Public Water Supply	Notify DEQ of results in a timely manner as required by law and follow through with appropriate actions.
District Staff	Respond to all TCR and TT violations plus complete loss of pressure events in a timely manner and determine whether a BWA needs to be issued. • If needed, assist supply in drafting BWA and determining most appropriate method of delivery with approval from the District Supervisor. • If needed, assist the supply in determining actions to remove the possible contamination including steps needed to rescind the BWA.
District Staff	Provide <u>on-site</u> technical assistance for acute TCR MCL violations and other boil water situations as appropriate.
District Supervisors	Assist District Staff in the all matters pertaining to issuing a BWA.

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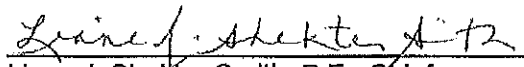
Subject: Guidelines for Issuing Boil Water Advisories to
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REFERENCES:

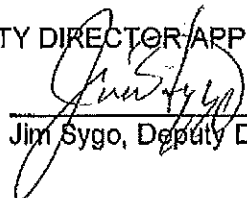
Safe Drinking Water Act, 1976 PA 399, as amended, being Michigan Compiled Law 325.1001 *et seq.*, and the administrative rules promulgated thereunder, being R 325.10101 *et seq.* of the Michigan Administrative Code.

OFFICE CHIEF APPROVAL:


Liane J. Shekter Smith, P.E., Chief
Office of Drinking Water and Municipal Assistance

1/18/2013
Date

DEPUTY DIRECTOR APPROVAL:


Jim Sygo, Deputy Director

1/24/2013
Date

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, March 10, 2015 1:47 PM
To: Busch, Stephen (DEQ)
Subject: FW: City of Flint February 2015 MOR
Attachments: February 2015 MOR.pdf

Steve,

The cold water and high flows challenged the city's ability to maintain acceptable treatment. Although they met standards according to our rules, the high treatment rate later in the month and low water temp did have some impact.

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, March 10, 2015 9:46 AM
To: Prysby, Mike (DEQ)
Subject: City of Flint February 2015 MOR

Mike,

Good morning, I just wanted to get you a copy of the February MOR. A copy will go out in the mail today.

Mike Glasgow
City of Flint Water Plant

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

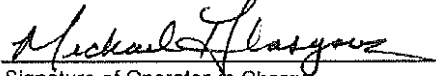
SUPPLY NAME: CITY of FLINT WATER PLANT
 WSSN: 2310

Michael Glasgow
 Operator-in-Charge

February 2015
 Month/Year

F-1R, F-2
 Certification of Operator-in-Charge

F-1
 Water Plant Classification


 Signature of Operator-in-Charge

Genesee
 County

Treatment Rate and Filter Data

Maximum Treatment Rate:	<u>25.3</u>	Million Gallons per Day
Rated Plant Capacity:	<u>36</u>	Million Gallons per Day
Average Filter Run:	<u>86</u>	Hours
Average Head Loss:	<u>n/a</u>	Feet *(filter head loss meters not operational)
Average Filtration Rate:	<u>2.4</u>	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	<u>3.3</u>	Gallons Per Square Feet per Minute
Average Wash Water Use:	<u>2.4%</u>	Percent of Treated Water

Chemical Data

Chlorine on hand:	<u>8,000</u> lb.	Est. supply:	<u>8</u> days
Primary Coagulant (Ferric Chloride) on hand:	<u>125,000</u> lb.	Est. supply:	<u>3</u> days
Lime (CaO) on hand:	<u>397</u> tons	Est. supply:	<u>31</u> days
Fluoride on Hand:	<u>26,600</u> lb.	Est. supply:	<u>40</u> days
Cost of All Chemicals per Million Gallons:	<u>n/a</u> dollars		
Total Power Cost per Million Gallons:	<u>n/a</u> dollars		

Remarks	Confluence Point # 1 (N)	Confluence Point # 2 (S)
Number of filter confluence samples > 0.3 NTU:	<u>1</u>	<u>0</u>
Number of filter confluence samples collected:	<u>218</u>	<u>218</u>
Percent of filter confluence samples > 0.3 NTU:	<u>0.5%</u>	<u>0.0%</u>
Number of filter confluence samples > 1 NTU	<u>0</u>	<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>NO</u>
If yes, indicate date(s) and duration on a separate sheet.		

[illegible]

Filter turbidity

City of Flint Water Treatment Plant

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Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	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	8	0.07	0.09	6	0	0	8	0.06	0.09	6	0	0	0.07
2	7	0.08	0.10	6	0	0	7	0.06	0.07	6	0	0	0.07
3	8	0.07	0.15	6	0	0	8	0.06	0.07	6	0	0	0.08
4	8	0.05	0.08	6	0	0	8	0.05	0.07	6	0	0	0.07
5	8	0.07	0.10	6	0	0	8	0.06	0.07	6	0	0	0.07
6	7	0.06	0.08	6	0	0	7	0.06	0.08	6	0	0	0.07
7	8	0.06	0.07	6	0	0	8	0.06	0.06	6	0	0	0.07
8	8	0.06	0.07	6	0	0	8	0.06	0.07	6	0	0	0.06
9	8	0.07	0.09	6	0	0	8	0.05	0.06	6	0	0	0.09
10	7	0.06	0.07	6	0	0	7	0.05	0.06	6	0	0	0.08
11	8	0.06	0.07	6	0	0	8	0.05	0.07	6	0	0	0.07
12	8	0.06	0.08	6	0	0	8	0.06	0.08	6	0	0	0.06
13	8	0.06	0.09	6	0	0	8	0.09	0.18	6	0	0	0.08
14	8	0.06	0.09	6	0	0	8	0.06	0.10	6	0	0	0.05
15	8	0.06	0.08	6	0	0	8	0.07	0.09	6	0	0	0.07
16	8	0.06	0.08	6	0	0	8	0.05	0.07	6	0	0	0.06
17	8	0.06	0.08	6	0	0	8	0.07	0.09	6	0	0	0.07
18	8	0.07	0.09	6	0	0	8	0.07	0.09	6	0	0	0.07
19	8	0.07	0.09	6	0	0	8	0.06	0.08	6	0	0	0.07
20	8	0.07	0.08	6	0	0	8	0.07	0.10	6	0	0	0.07
21	8	0.08	0.14	6	0	0	8	0.08	0.10	6	0	0	0.08
22	8	0.09	0.12	6	0	0	8	0.10	0.13	6	0	0	0.08
23	8	0.13	0.16	6	0	0	8	0.07	0.10	6	0	0	0.10
24	7	0.19	0.36	6	1	1	7	0.14	0.18	6	0	0	0.17
25	8	0.08	0.10	6	0	0	8	0.10	0.12	6	0	0	0.11
26	8	0.13	0.17	6	0	0	8	0.13	0.18	6	0	0	0.14
27	8	0.19	0.29	6	0	0	8	0.15	0.18	6	0	0	0.15
28	8	0.20	0.27	6	0	0	8	0.13	0.18	6	0	0	0.15
Avg.	8	0.08	0.12	6	0	0	8	0.07	0.10	6	0	0	
Max.	8	0.20	0.36	6	1	1	8	0.15	0.18	6	0	0	0.17
Min.	7	0.05	0.07	6	0	0	7	0.05	0.06	6	0	0	

Fluoridation &
ChlorinationCity of Flint Water Treatment Plant
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Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.3	0.23	0.53		1.6	3.1	4.7	0.3	0.6	2.6	3.0	2.5	2.9
2	0.3	0.22	0.48		1.8	2.9	4.7	0.3	0.5	2.4	2.7	2.2	2.5
3	0.3	0.23	0.51	0.52	1.9	3.0	4.9	0.8	1.2	2.6	2.9	2.4	2.7
4	0.4	0.22	0.53		1.9	3.0	4.9	0.6	0.8	2.8	3.0	2.7	3.0
5	0.3	0.22	0.53		1.9	2.9	4.8	0.5	0.7	2.6	3.0	2.2	2.5
6	0.4	0.22	0.57		2.0	3.0	5.0	0.8	1.0	2.7	3.0	2.3	2.8
7	0.3	0.22	0.58		2.1	2.7	4.8	0.3	0.6	2.6	2.9	2.1	2.4
8	0.4	0.23	0.56		2.1	2.7	4.8	0.6	0.8	2.7	3.0	2.2	2.5
9	0.4	0.22	0.64		1.9	2.8	4.7	0.4	0.6	2.7	3.0	2.3	2.6
10	0.4	0.24	0.63	0.56	2.2	2.9	5.1	0.5	0.7	2.8	3.1	2.1	2.4
11	0.4	0.21	0.55		2.2	2.8	5.0	0.7	0.9	2.6	2.8	1.9	2.4
12	0.4	0.21	0.58		2.2	2.7	4.9	0.6	0.8	2.5	2.8	2.1	2.5
13	0.4	0.23	0.59		2.2	2.4	4.6	0.4	0.6	2.0	2.5	1.7	2.2
14	0.4	0.22	0.55		2.2	2.2	4.4	0.6	0.8	2.3	2.6	1.5	2.1
15	0.4	0.21	0.60		2.1	2.2	4.3	0.4	0.6	2.0	2.4	1.9	2.2
16	0.4	0.23	0.59		2.1	2.2	4.3	0.4	0.6	2.1	2.4	1.8	2.1
17	0.4	0.21	0.61	0.54	2.1	2.3	4.4	0.8	1.0	2.0	2.4	1.3	1.7
18	0.3	0.23	0.58		2.0	2.2	4.2	0.3	0.6	1.9	2.4	1.5	2.0
19	0.3	0.24	0.64		2.2	2.1	4.3	0.6	0.8	2.0	2.4	1.7	2.2
20	0.4	0.23	0.56		2.2	2.1	4.3	0.7	1.0	2.0	2.5	1.5	1.9
21	0.4	0.24	0.61		2.2	2.1	4.3	0.5	0.7	1.7	2.2	1.5	2.0
22	0.4	0.23	0.55		2.2	2.1	4.3	0.4	0.6	2.0	2.3	1.7	1.9
23	0.3	0.24	0.64		2.2	2.2	4.4	0.5	0.6	2.0	2.1	1.5	1.6
24	0.3	0.24	0.56	0.54	2.3	2.6	4.9	0.4	0.6	2.5	3.3	2.1	2.5
25	0.3	0.23	0.62		2.3	2.6	4.9	0.5	0.7	2.5	2.9	2.4	2.7
26	0.3	0.23	0.54		2.3	2.7	5.0	0.5	0.7	2.7	3.1	2.5	3.0
27	0.3	0.24	0.56		2.3	2.5	4.8	0.6	0.8	2.3	2.9	2.1	2.5
28	0.3	0.24	0.56		2.3	2.5	4.8	0.6	0.8	2.3	2.8	1.9	2.5
Avg.	0.35	0.23	0.57	0.54	2.1	2.6	4.7	0.5	0.7	2.4	2.7	2.0	2.4
Max.	0.40	0.24	0.64	0.56	2.3	3.1	5.1	0.8	1.2	2.8	3.3	2.7	3.0
Min.	0.30	0.21	0.48	0.52	1.6	2.1	4.2	0.3	0.5	1.7	2.1	1.3	1.6

Chemical Analyses

City of Flint Water Treatment Plant
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Date	pH (S.U.)		Total Hardness as CaCO ₃ (mg/L)		Total Alkalinity as CaCO ₃ (mg/L)		Non-Carbonate Hardness as CaCO ₃ (mg/L)		Calcium as Ca ²⁺ (mg/L)		Magnesium as Mg ²⁺ (mg/L)		Chloride as Cl ⁻ (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	7.78	7.91	339	198	273	60	66	138	109.0	56.9	17.5	14.1	51	98
2	7.92	7.64	343	203	274	77	69	126	110.6	60.1	15.6	12.6	52	91
3	7.75	8.69	344	176	276	62	68	114	113.8	54.5	13.6	10.2	57	90
4	8.04	7.88	346	176	277	62	69	114	114.6	54.5	14.6	10.2	49	88
5	7.77	7.56	349	183	284	63	65	120	118.6	60.9	12.6	7.3	55	89
6	7.92	7.63	350	180	276	52	74	128	117.8	52.9	13.6	11.7	54	95
7	8.07	7.76	348	185	282	68	66	117	113.8	54.5	15.6	11.7	52	92
8	8.05	7.57	347	181	278	50	69	131	111.4	51.3	16.5	12.6	51	91
9	8.11	7.66	349	183	280	62	69	121	112.2	52.9	16.5	12.2	53	94
10	7.95	7.65	350	168	284	47	66	121	113.0	57.7	16.5	6.8	56	95
11	7.97	7.76	345	173	274	54	71	119	109.0	49.7	17.9	12.6	51	92
12	7.85	7.66	342	169	274	51	68	118	117.8	59.3	12.2	5.3	55	92
13	7.77	7.70	345	170	267	53	78	117	121.0	57.7	11.2	4.9	54	90
14	7.86	7.54	344	173	269	52	75	121	125.0	63.3	7.3	3.9	56	93
15	8.00	7.73	349	176	280	53	69	123	113.0	50.5	16.0	12.2	50	94
16	7.89	7.68	353	169	285	47	68	122	123.4	63.7	10.7	8.7	55	95
17	8.05	7.92	360	172	281	49	79	123	118.6	48.9	15.6	11.7	53	92
18	7.96	7.97	352	218	282	102	70	116	125.9	78.6	8.7	5.3	54	91
19	8.11	7.82	358	208	281	91	67	117	120.2	59.3	14.6	13.1	53	92
20	7.93	7.90	362	207	286	94	76	113	133.1	76.2	7.3	4.4	55	87
21	8.00	8.06	362	214	284	98	78	116	133.9	76.2	6.8	4.4	54	86
22	7.98	8.03	366	227	294	113	72	114	116.2	67.3	18.5	14.1	52	88
23	8.07	8.31	361	225	293	112	68	113	121.8	68.9	14.1	12.6	52	86
24	7.95	7.85	361	227	289	101	72	126	133.9	78.6	5.8	6.8	54	88
25	8.03	8.14	365	244	295	127	70	117	118.6	77.8	16.5	11.7	55	89
26	7.91	7.88	365	235	288	108	77	127	132.3	86.6	8.3	4.9	55	89
27	7.96	7.85	354	241	291	117	63	124	131.5	91.4	6.3	2.9	57	89
28	7.90	7.72	358	228	228	115	130	113	127.5	84.2	9.7	3.9	54	87
Avg.	7.95	7.84	352	197	280	76	73	120	119.9	63.7	12.9	9.0	54	91
Max.	8.11	8.69	366	244	295	127	130	138	133.9	91.4	18.5	14.1	57	98
Mln.	7.75	7.54	339	168	228	47	63	113	109.0	48.9	5.8	2.9	49	86

Avg.								0.52	3.0				
Max.		365					183	0	0.61	4.5			
Min.									0.45	0.5			

Distribution System
MonitoringCity of Flint Water Treatment Plant
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February 2015

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Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										
	1	2	3	4	5	6	7	8	CS	WS	Number of Samples
1											0
2											0
3	0.7	1.5	1.5	1.5	1.5	0.2	1.7	1.7	1.3	2.0	10
4											0
5	1.0	1.7	1.7	1.7	1.1	0.2	1.8	2.0	0.7	1.4	10
6											0
7											0
8											0
9											0
10	1.0	1.2	1.5	1.3	1.0	0.2	2.0	1.9	0.7	1.0	10
11	1.0	1.3	1.7	1.7	0.9	0.3	1.7	2.3	0.5	0.9	10
12	0.4	1.4	2.3	1.8	0.7	0.2	1.9	2.2	0.5	1.2	10
13											0
14											0
15											0
16											0
17	1.1	0.7	1.2	1.5	0.7	0.2	1.1	1.3		1.5	9
18	1.2	0.8	1.6	1.2	0.8	0.2	1.8	1.7		1.4	9
19	0.9	0.7	1.3	1.0	0.7	0.2	0.8	1.3		1.0	9
20											0
21											0
22											0
23	1.3	0.8	1.3	1.1	0.6	0.2	0.6	1.5		0.8	9
24	1.5	1.1	1.7	1.2	1.0	0.2	2.5	2.2		2.3	9
25											0
26	1.7	1.4	2.0	1.5	1.1	0.3	1.8	1.8		2.1	9
27											0
28											0

Distribution Sample Summary

Total # of routine distribution samples analyzed	104
Total # of routine distribution samples required	100

Distribution Bacteriological Summary

Total # of positive routine distribution samples	0
Percent of routine distribution samples positive	0%

See page 9 for positive sample information.

Distribution Disinfectant Total Residual Summary

Percentage of samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.22

**Distribution
System Monitoring**

City of Flint Water Treatment Plant

February 2015

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WSSN: 2310

Date	Total Chlorine Residual at Bacteriological Monitoring Stations mg/l										Number of Samples
	1	2	3	4	5	6	7	8	CS	WS	
1											0
2											0
3	1.0	1.8	1.8	1.9	1.8	0.3	2.0	1.9	1.7	2.4	10
4											0
5	1.3	2.1	2.0	2.0	1.3	0.4	2.1	2.3	1.0	1.6	10
6											0
7											0
8											0
9											0
10	1.3	1.5	1.9	1.6	1.3	0.4	2.4	2.2	1.0	1.3	10
11	1.2	1.5	1.8	1.9	1.1	0.4	1.9	2.6	0.7	1.2	10
12	0.5	1.6	2.4	2.0	0.9	0.4	2.1	2.4	0.6	1.4	10
13											0
14											0
15											0
16											0
17	1.3	1.0	1.4	1.8	0.9	0.3	1.5	1.8		1.7	9
18	1.5	1.0	1.9	1.5	1.0	0.3	2.1	2.0		1.7	9
19	1.3	1.1	1.6	1.5	1.0	0.3	1.0	1.7		1.3	9
20											0
21											0
22											0
23	1.5	1.0	1.6	1.3	0.8	0.3	0.8	1.8		1.2	9
24	1.7	1.3	1.9	1.4	1.2	0.4	2.8	2.4		2.5	9
25											0
26	1.9	1.6	2.4	1.7	1.4	0.5	2.1	2.0		2.5	9
27											0
28											0

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.5

Positive Distribution Samples

[illegible]

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, July 11, 2014 11:42 AM
To: Rosenthal, Adam (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: FW: City of Flint June 2014 MOR
Attachments: June 2014 MOR scan.pdf

Adam,

Here's Flint's June 2014 MOR...as we discussed, the distribution system CL2 residual problem has worsened not to mention 2 positives (from their reservoirs). I will confirm with Brent as to whether they installed chlorination at the Westside/Cedar St. PSs for SDWIS update ...as he indicated in my most recent site visit.

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

From: Michael Glasgow [<mailto:mglasgow@cityofflint.com>]
Sent: Thursday, July 10, 2014 3:11 PM
To: Prysby, Mike (DEQ)
Subject: City of Flint June 2014 MOR

Mike,

Good afternoon, I hope you had an enjoyable holiday weekend. Attached is a copy of our June 2014 MOR. There were a few alterations as per our discussion in early June. A copy is being sent out in the mail today. I just thought you might like a copy a few days before it arrives in the mail.

Mike Glasgow
City of Flint Water Plant

CITY of FLINT WATER TREATMENT PLANT MONTHLY OPERATION REPORT

SUPPLY NAME: CITY of FLINT WATER PLANT

WSSN: 2310

Michael Glasgow

Operator-in-Charge

June 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>25</u>	Million Gallons per Day
Rated Plant Capacity:	<u>36</u>	Million Gallons per Day
Average Filter Run:	<u>74</u>	Hours
Average Head Loss:	<u>*</u>	Feet *(filter head loss meters not operational)
Average Filtration Rate:	<u>2.5</u>	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	<u>3.5</u>	Gallons Per Square Feet per Minute
Average Wash Water Use:	<u>3.6%</u>	Percent of Treated Water

Chemical Data

Chlorine on hand:	<u>24000</u> lb.	Est. supply:	<u>20</u> days
Primary Coagulant (Ferric Chloride) on hand:	<u>63450</u> lb.	Est. supply:	<u>10</u> days
Lime (CaO) on hand:	<u>169</u> tons	Est. supply:	<u>18</u> days
Fluoride on Hand:	<u>9064</u> lb.	Est. supply:	<u>16</u> days
Cost of All Chemicals per Million Gallons:	<u>*</u> dollars		
Total Power Cost per Million Gallons:	<u>*</u> dollars		

Remarks

Confluence Point # 1 (N)

Confluence Point # 2 (S)

Number of filter confluence samples > 0.3 NTU:

00

Number of filter confluence samples collected:

180180

Percent of filter confluence samples > 0.3 NTU:

0.00%0.00%

Number of filter confluence samples > 1 NTU

00

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?

NO

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?

NO

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?

NO

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?

NO

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?

NO

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?

NO

If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month?

YES

If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month?

NO

If yes, indicate date(s) and duration on a separate sheet.

[illegible]

Filter turbidity

City of Flint Water Treatment Plant
WSSN: 2310

June 2014

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Date	Turbidity, Units												
	Confluence Point. No.1 (N) North						Confluence Point. No.2 (S) South						Point of Entry
	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	6	0.09	0.12	6	0	0	6	0.09	0.11	6	0	0	0.07
2	6	0.11	0.16	6	0	0	6	0.10	0.14	6	0	0	0.09
3	6	0.14	0.23	6	0	0	6	0.12	0.19	6	0	0	0.11
4	6	0.14	0.19	6	0	0	6	0.09	0.11	6	0	0	0.10
5	6	0.18	0.24	6	0	0	6	0.15	0.22	6	0	0	0.15
6	6	0.13	0.15	6	0	0	6	0.12	0.16	6	0	0	0.12
7	6	0.14	0.18	6	0	0	6	0.12	0.14	6	0	0	0.12
8	6	0.12	0.20	6	0	0	6	0.15	0.20	6	0	0	0.12
9	6	0.15	0.25	6	0	0	6	0.14	0.22	6	0	0	0.11
10	6	0.21	0.26	6	0	0	6	0.14	0.23	6	0	0	0.14
11	6	0.11	0.16	6	0	0	6	0.12	0.23	6	0	0	0.16
12	6	0.11	0.13	6	0	0	6	0.10	0.13	6	0	0	0.09
13	6	0.09	0.12	6	0	0	6	0.09	0.11	6	0	0	0.08
14	6	0.11	0.13	6	0	0	6	0.09	0.12	6	0	0	0.10
15	6	0.11	0.18	6	0	0	6	0.10	0.15	6	0	0	0.10
16	6	0.11	0.14	6	0	0	6	0.09	0.10	6	0	0	0.09
17	6	0.09	0.13	6	0	0	6	0.07	0.13	6	0	0	0.07
18	6	0.09	0.13	6	0	0	6	0.08	0.20	6	0	0	0.08
19	6	0.08	0.14	6	0	0	6	0.09	0.17	6	0	0	0.08
20	6	0.08	0.10	6	0	0	6	0.07	0.09	6	0	0	0.16
21	6	0.07	0.08	6	0	0	6	0.08	0.20	6	0	0	0.08
22	6	0.08	0.11	6	0	0	6	0.09	0.12	6	0	0	0.08
23	6	0.08	0.10	6	0	0	6	0.08	0.11	6	0	0	0.07
24	6	0.09	0.14	6	0	0	6	0.10	0.26	6	0	0	0.13
25	6	0.07	0.14	6	0	0	6	0.08	0.19	6	0	0	0.09
26	6	0.08	0.10	6	0	0	6	0.08	0.10	6	0	0	0.09
27	6	0.09	0.11	6	0	0	6	0.08	0.10	6	0	0	0.09
28	6	0.08	0.10	6	0	0	6	0.09	0.10	6	0	0	0.10
29	6	0.10	0.14	6	0	0	6	0.09	0.12	6	0	0	0.11
30	6	0.10	0.11	6	0	0	6	0.09	0.14	6	0	0	0.15
Avg.	6	0.11	0.15	6	0	0	6	0.10	0.15	6	0	0	
Max.	6	0.21	0.26	6	0	0	6	0.15	0.26	6	0	0	0.16
Min.	6	0.07	0.08	6	0	0	6	0.07	0.09	6	0	0	

**Fluoridation &
Chlorination**
**City of Flint Water Treatment Plant
WSSN: 2310**
June 2014
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Date	Fluoride Applied as F- mg/L	Fluoride Analysis (mg/L)			Chlorine Application (mg/L)			Chlorine Residual (mg/L)					
					Intermediate Chlorine	Post Chlorine	Total Chlorine	Filtered		3 MG Well		Tap	
		Raw	Tap	Dist.				Free	Total	Free	Total	Free	Total
1	0.00	0.15	0.17		4.8	1.5	6.3	1.3	1.6	1.5	2.0	1.2	1.7
2	0.00	0.16	0.17		4.7	1.7	6.4	1.1	1.5	1.6	2.0	1.3	1.5
3	0.00	0.16	0.16		5.4	1.8	7.2	1.0	1.5	1.5	2.0	1.3	1.7
4	0.50	0.18	0.20		5.3	2.0	7.3	1.4	1.8	1.8	2.1	1.7	2.0
5	0.50	0.14	0.45	0.25	4.5	2.0	6.5	0.9	1.2	1.6	1.9	1.3	1.7
6	0.00	0.15	0.16		4.7	2.4	7.1	0.7	1.0	1.6	1.9	1.4	1.7
7	0.00	0.14	0.18		5.5	2.8	8.3	0.7	1.0	1.6	2.0	1.3	1.6
8	0.00	0.17	0.19		5.2	2.7	7.9	0.7	0.9	1.5	1.9	1.3	1.7
9	0.00	0.17	0.18		5.1	2.7	7.8	0.5	0.9	1.7	2.1	1.3	1.8
10	0.00	0.16	0.18		4.8	2.5	7.3	0.3	0.6	1.4	1.8	1.2	1.6
11	0.00	0.17	0.14		4.8	3.1	7.9	0.9	1.2	1.7	2.2	1.6	1.9
12	0.00	0.14	0.13	0.18	4.2	2.9	7.1	0.8	1.2	2.0	2.4	1.9	2.3
13	0.00	0.16	0.14		4.4	3.4	7.8	0.6	0.8	2.4	2.8	2.1	2.4
14	0.00	0.16	0.14		4.2	3.5	7.7	0.7	1.0	2.4	2.8	2.0	2.4
15	0.00	0.16	0.13		4.1	3.5	7.6	0.4	0.8	2.3	2.9	1.7	2.0
16	0.00	0.16	0.13		4.2	3.5	7.7	0.8	1.0	2.6	3.1	2.1	2.5
17	0.00	0.15	0.13		4.6	3.1	7.7	1.1	1.5	2.5	2.9	2.2	2.5
18	0.00	0.16	0.13		5.0	2.6	7.6	1.3	1.5	2.5	3.0	2.0	2.5
19	0.00	0.14	0.13	0.18	5.0	2.9	7.9	1.4	1.6	2.7	3.1	2.1	2.4
20	0.00	0.16	0.13		5.0	3.1	8.1	1.3	1.5	2.3	2.8	1.7	2.1
21	0.00	0.16	0.13		5.0	4.0	9.0	1.1	1.4	2.3	2.8	2.0	2.2
22	0.00	0.17	0.13		4.9	4.0	8.9	0.8	1.0	2.4	3.0	2.1	2.4
23	0.00	0.16	0.13		4.7	2.6	7.3	1.4	1.7	2.5	2.8	2.2	2.7
24	0.00	0.16	0.13		4.8	2.9	7.7	1.3	1.5	2.5	2.9	2.7	3.0
25	0.00	0.16	0.13		4.7	2.9	7.6	1.2	1.5	2.5	2.9	2.0	2.4
26	0.00	0.17	0.12	0.15	3.9	3.0	6.9	1.0	1.4	2.2	2.6	2.5	3.0
27	0.00	0.16	0.13		4.9	2.7	7.6	1.2	1.5	2.9	3.2	2.1	2.5
28	0.00	0.16	0.14		4.6	3.0	7.6	1.5	1.8	2.3	3.0	2.4	3.0
29	0.00	0.15	0.14		3.8	3.5	7.3	0.8	1.2	2.3	2.8	1.9	2.3
30	0.00	0.15	0.13		4.1	3.2	7.3	0.6	0.9	2.5	3.3	1.8	2.1
Avg.	0.03	0.16	0.16	0.19	4.7	2.9	7.5	1.0	1.3	2.1	2.6	1.8	2.2
Max.	0.50	0.18	0.45	0.25	5.5	4.0	9.0	1.5	1.8	2.9	3.3	2.7	3.0
Min.	0.00	0.14	0.12	0.15	3.8	1.5	6.3	0.3	0.6	1.4	1.8	1.2	1.5

Chemical Analyses

City of Flint Water Treatment Plant
WSSN: 2310

June 2014

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Date	pH (S.U.)		Total Hardness as CaCO ₃ (mg/L)		Total Alkalinity as CaCO ₃ (mg/L)		Non-Carbonate Hardness as CaCO ₃ (mg/L)		Calcium as Ca ²⁺ (mg/L)		Magnesium as Mg ²⁺ (mg/L)		Chloride as Cl ⁻ (mg/L)	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
1	8.28	7.81	270	234	216	132	54	102	85.8	84.2	13.6	5.8	41	87
2	8.02	7.58	262	236	218	132	44	104	84.2	82.6	12.8	7.3	40	83
3	8.17	7.39	278	248	218	140	60	108	93.0	77.8	6.3	13.1	43	75
4	8.25	7.49	276	238	220	144	56	94	80.2	79.4	18.5	9.2	41	79
5	8.26	7.49	274	236	220	148	54	88	89.0	79.4	12.6	9.2	44	80
6	8.16	7.52	262	234	216	146	46	88	85.0	77.0	12.2	10.2	43	93
7	8.21	7.27	268	260	226	172	42	88	87.4	85.0	12.2	11.7	42	80
8	8.26	7.36	260	262	222	170	38	92	81.0	82.6	13.6	12.2	43	80
9	8.17	7.36	268	266	220	164	48	102	93.0	85.8	8.3	10.2	44	79
10	8.18	7.21	270	260	226	172	44	88	98.2	94.6	4.9	5.8	45	78
11	8.10	7.38	266	192	220	100	46	92	83.4	64.1	14.1	7.8	43	86
12	8.11	7.44	268	192	222	100	46	92	84.2	64.1	14.1	7.8	42	80
13	8.01	7.56	264	218	218	110	46	108	85.8	70.5	12.2	10.2	42	81
14	7.94	7.65	272	210	216	114	58	96	90.6	68.1	11.2	9.7	40	78
15	8.27	7.57	268	188	226	100	42	88	85.8	67.3	13.1	4.9	43	79
16	8.34	7.75	266	186	220	94	46	92	84.2	64.9	13.1	5.8	44	80
17	8.12	7.68	262	190	222	92	40	98	90.6	68.9	7.3	4.4	43	80
18	8.24	7.24	268	184	230	94	38	90	87.4	66.5	12.2	3.4	40	81
19	8.13	7.61	272	182	228	88	44	94	91.4	62.5	8.3	6.3	42	81
20	8.01	7.33	264	180	222	88	42	92	89.0	60.9	10.2	8.7	42	83
21	7.98	7.35	252	182	226	82	26	100	86.6	64.1	9.0	5.3	43	84
22	8.00	7.45	264	180	224	84	40	96	87.4	59.3	11.2	7.8	42	81
23	7.98	7.00	260	168	224	74	38	94	89.8	53.7	8.7	8.3	46	88
24	7.92	7.60	274	194	222	82	52	112	89.0	60.9	10.7	10.2	45	87
25	7.98	7.68	276	168	228	70	48	98	91.4	58.5	11.7	5.3	43	90
26	7.88	7.72	280	186	226	80	54	106	86.6	65.7	15.6	5.3	46	90
27	7.92	7.12	254	176	224	66	30	110	89.8	67.3	7.3	1.9	39	92
28	7.97	7.64	272	176	230	74	42	102	85.0	64.1	14.6	3.9	43	85
29	8.26	7.49	276	178	232	76	44	102	87.4	55.3	12.2	9.7	40	90
30	7.94	7.70	268	156	230	66	38	90	92.2	56.9	9.2	3.4	44	91
Avg.	8.10	7.48	268	205	223	108	45	97	87.7	69.7	11.4	7.5	43	83
Max.	8.34	7.81	280	266	232	172	60	112	96.2	94.6	18.5	13.1	46	93
Min.	7.88	7.00	252	156	216	66	26	88	80.2	53.7	4.9	1.94	39	75

Bacteriological &
Physical ParametersCity of Flint Water Treatment Plant
WSSN: 2310

June 2014

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Date	Total Coliform						Standard Plate Count (Simplate MPN)		Wind Direction	Temp. C	Color		Odor	
	Raw (Colilert MPN)		Filter Confluence (N&S)		Plant Tap									
	# Samples	Count	# Samples	# pos	# Samples	# pos	Raw	Tap			Raw	Raw	Tap	Raw
1	1	320	12	1	1	0	3020	<2		21.7				
2	1	62	12	0	1	0	7840	<2		20.5				
3	1	1710	12	0	1	0	4180	<2		22.4				
4	1	3232	12	0	1	0	5980	<2		22.1				
5	1	3232	12	0	1	0	1368	<2		21.5				
6	1	4286	12	2	1	0	1540	<2		22.2				
7	1	4374	12	0	1	0	11100	<2		22.5				
8	1	3328	12	0	1	0	7840	<2		21.7				
9	1	1768	12	0	1	0	9400	<2		21.5				
10	1	6152	12	0	1	0	11100	<2		23.9				
11	1	12262	12	0	1	0	3660	<2		23.4				
12	1	8704	12	0	1	0	12460	<2		22.9				
13	1	4978	12	0	1	0	1720	<2		22.3				
14	1	4082	12	0	1	0	1240	<2		20.9				
15	1	3912	12	0	1	0	1660	<2		21.7				
16	1	3440	12	0	1	0	1940	<2		22.7				
17	1	2748	12	0	1	0	1600	<2		23.3				
18	1	2338	12	0	1	0	2080	<2		23.3				
19	1	1542	12	0	1	0	7840	<2		22.8				
20	1	1678	12	0	1	0	1180	<2		22.4				
21	1	1672	12	0	1	0	960	<2		21.8				
22	1	7308	12	0	1	0	7440	<2		22.0				
23	1	4028	12	0	1	0	3900	<2		21.6				
24	1	1234	12	0	1	0	3780	<2		22.5				
25	1	2100	12	0	1	0	2240	<2		22.5				
26	1	2396	12	0	1	0	5140	<2		22.0				
27	1	1968	12	0	1	0	2000	<2		22.9				
28	1	1976	12	0	1	0	11100	<2		22.9				
29	1	2802	12	0	1	0	6780	<2		25.8				
30	1	9572	12	0	1	0	2560	<2		24.8				
Avg.										22.5				
Max.							12460	0		25.8				
Min.										20.5				

Distribution System
MonitoringCity of Flint Water Treatment Plant
WSSN: 2310

June 2014

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Date	Free Chlorine Residual at Bacteriological Monitoring Stations mg/l										Number of Samples
	1	2	3	4	5	6	7	8	CS	WR	
1											0
2									0.5	0.0	2
3									0.2	0.0	2
4	0.5	0.9	0.5	0.5	0.2	0.5	0.4	0.9	0.2	0.0	10
5	0.4	0.2	0.5	0.4	0.1	0.6	0.3	0.9	0.1	0.0	10
6									0.1	0.0	2
7											0
8											0
9									0.1	0.0	2
10	0.6	1.1	0.4	0.6	0.2	0.6	0.3	0.7	0.3	0.0	10
11									0.0	0.0	2
12	1.2	1.8	0.9	1.3	0.6	0.9	0.5	1.8	1.4	0.0	10
13									0.1	0.0	2
14											0
15											0
16									1.2	0.0	2
17	1.3	1.5	1.0	0.5	0.7	1.5	0.9	2.0	0.2	0.3	10
18	1.4	1.1	1.2	1.1	0.3	1.2	0.9	1.4	0.6	0.1	10
19									0.2	0.1	2
20											0
21											0
22											0
23											0
24											0
25	1.3	1.3	1.1	1.0	0.3	0.8	1.0	1.5	0.9	0.4	10
26	1.1	1.4	0.9	0.0	0.0	1.4	0.8	2.1	0.9	0.6	10
27									0.7	1.1	2
28											0
29											0
30									0.6	1.3	2

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	86%
Average disinfectant residual this month	0.7

Distribution Bacteriological Summary

Total # of positive routine distribution samples	2
Percent of routine distribution samples positive	2%

Positive Distribution Samples

Date	Monitoring Station	Date	Repeat Monitoring Stations	Residual	Positive or Negative
6/10/2014	WEST SIDE	6/11/2014	WS UPSTREAM	.10/.30	ABSENT
		6/11/2014	WS DOWNSTREAM	.10/.30	ABSENT
		6/11/2014	WEST SIDE	0/.10	ABSENT
6/11/2014	CEDAR STREET	6/12/2014	CS UPSTREAM	0.2/0.4	ABSENT
		6/12/2014	CS DOWNSTREAM	0.2/0.3	ABSENT
		6/12/2014	CEDAR STREET	1.4/1.8	ABSENT

**Distribution System
Monitoring**

 City of Flint Water Treatment Plant
WSSN: 2310

June 2014

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Date	Total Chlorine Residual at Bacteriological Monitoring Stations mg/l										Number of Samples
	1	2	3	4	5	6	7	8	CS	WR	
1											0
2									0.8	0.2	2
3									0.3	0.2	2
4	1.0	1.3	0.8	0.9	0.3	1.0	0.6	1.1	0.3	0.2	10
5	0.8	0.6	0.8	0.6	0.3	0.8	0.6	1.1	0.3	0.2	10
6									0.3	0.2	2
7											0
8											0
9									0.2	0.2	2
10	1.0	1.6	0.7	1.1	0.6	1.2	0.7	1.2	0.5	0.2	10
11									0.2	0.1	2
12	1.7	2.5	1.3	1.7	0.9	1.2	0.9	2.3	1.8	0.1	10
13									0.3	0.2	2
14											0
15											0
16									1.6	0.2	2
17	1.9	1.9	1.3	0.7	1.0	2.0	1.3	2.9	0.3	0.5	10
18	2.0	1.5	1.8	1.5	0.6	1.6	1.4	2.1	0.9	0.3	10
19									0.3	0.3	2
20											0
21											0
22											0
23											0
24											0
25	1.8	1.9	1.6	1.4	0.5	1.1	1.4	2.0	1.1	0.7	10
26	1.5	1.9	1.3	0.1	0.1	1.8	1.1	2.5	1.1	0.8	10
27									1.0	1.5	2
28											0
29											0
30									0.9	1.3	2

Distribution Disinfectant Total Residual Summary	
Percent samples with a detectable disinfectant residual	100%
Average disinfectant residual this month	1.0

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, October 23, 2013 4:21 PM
To: Busch, Stephen (DEQ)
Subject: FW: City of Flint

Steve,

Below is the electrical service upgrade (outline of proposal) presented by Warren. I will also review the proposal and we can discuss further next week.

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

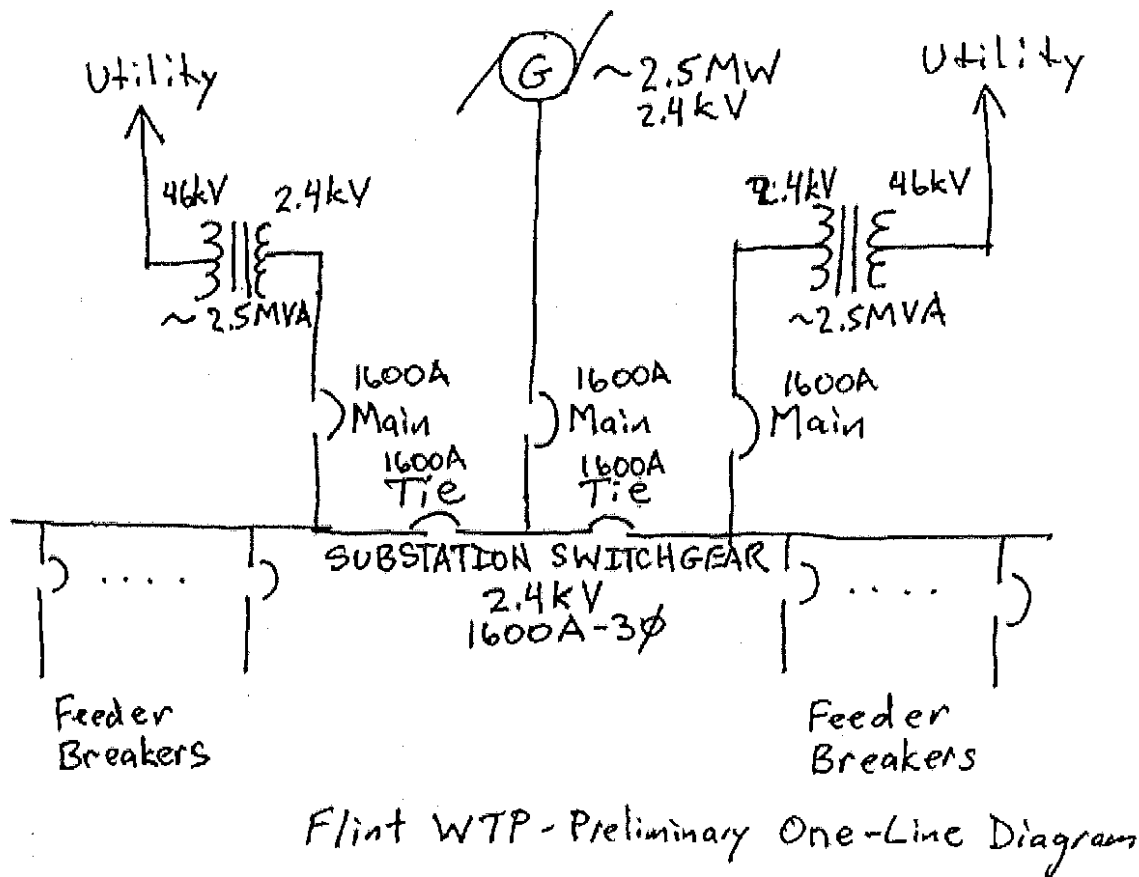
From: Green, Warren [<mailto:jwggreen@lan-inc.com>]
Sent: Wednesday, October 23, 2013 3:41 PM
To: Prysby, Mike (DEQ)
Cc: 'Brent Wright'
Subject: City of Flint

Mike

As you know, the Flint Water Plant (FWP) currently uses 2400V as primary power throughout the facility. All of the power feeders in the plant site are 5kV rated and it appears the existing switchgear is also rated at 5kV. Most of the major electrical improvements installed during Phase I were dual voltage (2400/4160) equipment in anticipation of the plant power being changed to 4160V in the future. However, this voltage conversion is not needed for the phase of work.

The current sub-station has two 2.5 MVA transformers running in parallel for a total capacity 5 MVA. These old transformers are not equipped with cooling fans. Based on the evaluation performed during the Phase II study, which was completed in 2003, the full connected load to these transformers is estimated to be 6.97 MVA while the estimated power load at 36-mgd is 4.22 MVA. Based on these estimates there is sufficient power for the plant with both sub-station transformers in service. Even though the transformers are owned by Consumers Energy, it could take weeks to replace one of these main transformers in the event of a unit failure, which will result in reduced treatment and pumping capacity. The sub-station switchgear was installed in 1960 and is antiquated and difficult to maintain.

Since the 2003 study, Flint's maximum day water demand has decreased to approximately 20-mgd, which has correspondingly reduced the estimated power load. At this time it is believed that two 2.0 to 2.5 MW transformers will be required to power the FWP to meet maximum day demand and one transformer will meet average day demand under emergency conditions. We are proposing to construct a new substation with two – 2.0 to 2.5 MW pad mounted transformers, along with substation switch gear, interconnected with one 2.0 to 2.5 MW intermittent duty diesel generator as shown below. This arrangement will allow the generator to backup either transformer to cover maximum day demands should one of the transformers or transformer feeds drop off line and to provide sufficient generation capacity to meet average day demands.



Would you please review and provide any comments that you may have.

Thanks Warren

J. Warren Green, PE
Director of Engineering



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

One Oakbrook Terrace, 22nd Street and Butterfield Road, Suite 207 • Oakbrook Terrace, IL 60181
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Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, June 19, 2014 11:01 AM
To: Busch, Stephen (DEQ)
Subject: FW: CL2 Analyzer
Attachments: 20140619_102305.jpg

Steve,

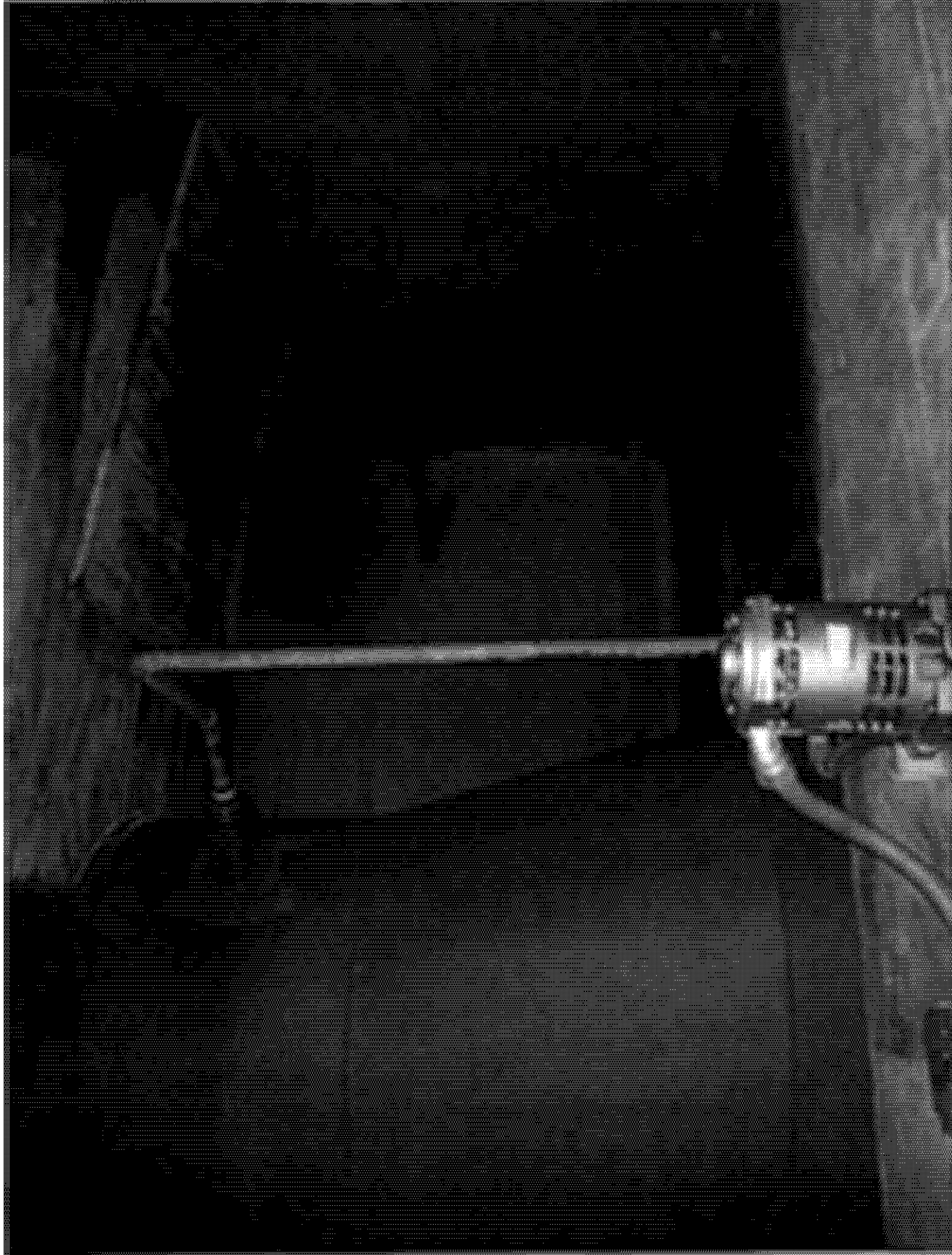
This should address the CL2 analyzer issue at the Flint WTP. By the sounds of Brent's email, it appears that this was in place. I question why they didn't know that already.

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, June 19, 2014 10:55 AM
To: Prysby, Mike (DEQ); Michael Glasgow
Subject: CL2 Analyzer

Mike the CL2 analyzer for PS#4 is already located in the suction well. The stand pipe was hooked up to the sample sink, that now is also pumped from the suction well. Attached is a picture of the tap and water line on the suction side of Pump #7. This water line is connected to a sample pump that pumps the water to the sample sink and the CL2 analyzer. I believe this set up is what you were looking for. If you have any questions please call me.

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: Prysby, Mike (DEQ)
Sent: Tuesday, April 01, 2014 9:07 AM
To: Bartley, Cheryl (DEQ); Bennett, Charles (DEQ); Kammer, Stephanie (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: FW: CO2 feed system - Flint MI project

This may be more of your call. This pertains to the Bray Road sludge lagoon site and the new decant structure that will direct decant water from the Flint WTP lime sludge to the sanitary sewer. The work will correct the unauthorized discharge that was occurring at the local receiving stream. Not sure if you have taken a look at the design.....the ODWMA anticipates issuing an Act 399 permit for the work at Bray Road within the next few weeks. I will be in the Frank Balcer room today after 10am for the balance of the day reviewing these plans.

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: Monday, March 31, 2014 8:07 PM
To: Prysby, Mike (DEQ)
Subject: FW: CO2 feed system - Flint MI project

Hi Mike,

Please see the options below. Let me know which is your preference.

Thanks.

Samir F. Matta
 Senior Project Manager



**Lockwood, Andrews
& Newnam, Inc.**
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D 517.819.2367 C 517.819.2367
www.lan-inc.com • sfmatta@lan-inc.com

From: Nakashima, Jeremy
Sent: Monday, March 31, 2014 11:41 AM
To: Matta, Samir
Subject: RE: CO2 feed system - Flint MI project

Samir,

There are 3 possible locations for sampling, two of which don't require sampling taps:

- At the decant tower near the gravity pipe (grab sample)
- At the wetwell (grab sample)
- At the valve vault (sampling tap required on discharge piping)

Does it need to have a sample tap?

Jeremy N. Nakashima, PE
Associate, Senior Project Manager



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& Newnam, Inc.**
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T 630.495.4123 x 6602 C 773.414.4643
www.lan-inc.com • JNNakashima@lan-inc.com

From: Matta, Samir
Sent: Monday, March 31, 2014 10:38 AM
To: Nakashima, Jeremy
Subject: Re: CO2 feed system - Flint MI project

Hi Jeremy,

The comments I sent you a while back about Bray road from Mike asks for a sampling tab for the decant water. We will need to show someplace.

Thanks.

Lockwood, Andrews & Newnam
Samir Matta, PE
(517) 819-2367

On Mar 31, 2014, at 10:47 AM, "Nakashima, Jeremy" <JNNakashima@lan-inc.com> wrote:

Mike,

As we discussed last week, the City is considering going with single phase power at the Bray Road site, but we need to perform a load analysis and confirm with the power company that they have the capacity for the single phase equipment. Mason McIntire from our Fort Worth office will be contacting you shortly to discuss the single phase equipment and electrical loads. As you recall, last week you said that we can reduce the size of the following equipment and still meet our design of capacity of 15 pph:

- 2 kW heater vs. original 4 kW heater
- 3 kW vaporizer vs. original 12 kW vaporizer

Please feel free to call if you have any questions. Thanks.

Jeremy

Jeremy N. Nakashima, PE
Associate, Senior Project Manager

<image001.gif>

One Oakbrook Terrace, 22nd Street and Butterfield Road, Suite 207 • Oakbrook Terrace, IL 60181
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Rennaker, Joanne (DEQ)

From: Ostrander, Debbie (DEQ)
Sent: Monday, March 09, 2015 1:27 PM
To: Prysby, Mike (DEQ); trzgreen@gchd.us
Cc: Busch, Stephen (DEQ); Shekter Smith, Liane (DEQ); Howes, Sarah (DEQ); Lachance, Amy (DEQ)
Subject: FW: Commercial Water Past Due Notices
Attachments: cycle 60 past due notice 030515.PDF

Hi All. Forwarding info I received today from DLARA. There are 4 mobile home parks (and several apartments) on this list for water shut off by the City of Flint. It seems that DLARA is no longer mitigating these situations at MHPs as they have in the past. Therefore we should be prepared for more calls, esp in situations where the residents are paying the community owner, but the owner isn't paying the city.

Debbie

Debbie Smith Ostrander
 Office of Drinking Water and Municipal Assistance
 Kalamazoo District Office
 P:269-491-4536
 F:269-567-3555

From: Pack, Tracie (LARA)
Sent: Monday, March 09, 2015 8:10 AM
To: Cordill, Todd (LARA); Ostrander, Debbie (DEQ)
Subject: FW: Commercial Water Past Due Notices

FYI – They specifically note parks effected - I think there were four.

From: Amanda Trujillo [<mailto:atrujillo@cityofflint.com>]
Sent: Friday, March 06, 2015 2:18 PM
To: Dayne Walling; Gerald Ambrose; Albert Mooney; Howard Croft; Daugherty Johnson; Mike Reiter; Tim Parker; James Gaskin; Pack, Tracie (LARA); James Tolbert; Dawn Steele; Peter Bade; Crystal Olmstead; Natasha Henderson
Subject: Commercial Water Past Due Notices

Attached is the list of commercial water accounts that have received a past due notice. The highlighted accounts are multi-unit housing.

Due date : 3/25/15
 Post Notice: 3/30/15
 Turn off date: 4/7/15

I will send an update after the due date to notify which buildings we will be posting the orange notices.

Thank you,

--

Amanda Trujillo
Deputy City Treasurer
Customer Service Center
810-766-7470 ext.2104
atrujillo@cityofflint.com

Past Due / Shutoff Listing

DUE DATE 3/25/15

TOFF DATE 4/7/15

1/13

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
ANN -000720-0000-03	6000-6004 Active	6003 720 ANN ARBOR ST	Commercial	1,223.50
ATHW-001517-0000-03	6000-6004 Active	6002 1517 W ATHERTON RD	Commercial	389.21
ATHW-001601-0000-01 52267-25521	6000-6004 Active	6002 1601 W ATHERTON RD	Commercial	469.05
ATHW-001625-0000-03	6000-6004 Active	6002 1625 W ATHERTON RD	Commercial	273.79
AVEN-001518-0000-05	6000-6004 Active	Kirkwood M.H. 6001 1518 N AVERILL AVE	Commercial	38,702.81
AVEN-003901-0000-02 56166-31562	6000-6004 Active	Richfield Apts 6001 3901 N AVERILL	Commercial	1,446.24
AVEN-003901-BLD1-02 56166-9154	6000-6004 Active	6001 3901 N AVERILL AVE BLDG1	Commercial	1,260.40
AVEN-003901-BLD2-02 56166-51336	6000-6004 Active	6001 3901 N AVERILL AVE BLDG2	Commercial	1,536.77
AVEN-003901-BLD3-02 56166-36809	6000-6004 Active	6001 3901 N AVERILL AVE BLDG3	Commercial	433.80
AVEN-003901-BLD4-02 56166-20314	6000-6004 Active	6001 3901 N AVERILL AVE BLDG4	Commercial	207.19
AVEN-003901-BLD5-02 56166-46151	6000-6004 Active	6001 3901 N AVERILL AVE BLDG5	Commercial	2,155.19
AVEN-003901-BLD6-02 56166-53436	6000-6004 Active	6001 3901 N AVERILL AVE BLDG6	Commercial	2,074.40
AVEN-003901-BLD7-02 56166-20374	6000-6004 Active	6001 3901 N AVERILL AVE BLDG7	Commercial	1,227.89
AVES-000200-0000-02 52935-35982	6000-6004 Active	6001 200 S AVERILL AVE	Residential	235.33
AVES-000230-0000-01 1005-46803	6000-6004 Active	6001 230 S AVERILL AVE	Commercial	349.43
AVES-002030-0000-01 52316-46103	6000-6004 Active	18 Unit Apt 6002 2030 S AVERILL AVE	Commercial	2,953.02
BALN-001161-LWR1-01 35256-18228	6000-6004 Active	6004 1161 N BALLENGER HWY LWR 1	Commercial	446.46
BALN-001161-LWR2-01 35257-54736	6000-6004 Active	6004 1161 N BALLENGER HWY LWR 2	Commercial	207.67
BALS-000401-0000-01 52349-53048	6000-6004 Active	6003 401 S BALLENGER HWY	Commercial	18,535.58

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
BALS-001202-0000-01 8369-48022	6000-6004 Active	6003 1202 S BALLENGER HWY	Commercial	344.09
BALS-001210-0000-01 8369-36646	6000-6004 Active	6003 1210 S BALLENGER HWY	Commercial	437.45
BEGO-000626-0000-02	6000-6004 Active	6003 626 BEGOLE ST	Commercial	470.80
CARE-000670-0000-02 55181-54140	6000-6004 Active	6004 670 E CARPENTER RD	Commercial	737.01
CENS-000406-000B-02	6000-6004 Active	6001 406 S CENTER RD UNIT B	Commercial	564.55
CENS-000680-0000-05	6000-6004 Active	6001 680 S CENTER RD	Commercial	8,802.62
CENS-000808-000A-02	6000-6004 Active	6001 808 S CENTER RD A	Commercial	617.90
CHEN-000500-0000-01 52471-25910	6000-6004 Active	6003 500 N CHEVROLET AVE	Commercial	1,080.86
CHEN-000508-000B-01 52471-55735	6000-6004 Active	6003 508 N CHEVROLET AVE B	Commercial	337.49
CHEN-000510-000C-01 52471-55736	6000-6004 Active	6003 510 N CHEVROLET AVE C	Commercial	331.69
CHUC-000444-0000-01 52476-49613	6000-6004 Active	6003 444 CHURCH ST	Commercial	1,168.99
CLIO-003051-0000-02 73563-27594	6000-6004 Active	6004 3051 CLIO RD	Commercial	679.68
CLIO-003117-0000-05	6000-6004 Active	6004 3117 CLIO RD	Commercial	302.97
CLIO-003129-0000-02 53664-13560	6000-6004 Active	6004 3129 CLIO RD	Commercial	1,048.03
CLIO-003212-0000-01 52485-24619	6000-6004 Active	6004 3212 CLIO RD	Commercial	4,269.73
CLIO-003521-0000-02	6000-6004 Active	6004 3521 CLIO RD	Commercial	478.46
CLIO-004810-00#1-05	6000-6004 Active	6004 4810 CLIO RD #1	Commercial	11,396.31
CLIO-006502-0000-02	6000-6004 Active	6004 6502 CLIO RD	Commercial	3,719.66
CLOV-005005-0000-02	6000-6004 Active	6004 5005 CLOVERLAWN DR	Commercial	1,199.27
CORU-002316-0000-02	6000-6004 Active	6003 2316 CORUNNA RD	Commercial	756.05

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
CORU-002317-0000-01 15011-24727	6000-6004 Active	6003 2317 CORUNNA RD	Commercial	464.85
CORU-002602-0000-03	6000-6004 Active	6003 2602 CORUNNA RD	Commercial	878.93
CORU-002614-0000-05	6000-6004 Active	6003 2614 CORUNNA RD	Commercial	420.21
CORU-002709-0000-03	6000-6004 Active	6003 2709 CORUNNA RD	Commercial	439.34
CORU-002932-0000-01 11389-45179	6000-6004 Active	6003 2932 CORUNNA RD	Commercial	771.67
CORU-003401-0000-06	6000-6004 Active	6003 3401 CORUNNA RD	Commercial	1,016.77
CORU-003402-0000-03	6000-6004 Active	6003 3402 CORUNNA RD	Commercial	503.63
CORU-003410-0000-02	6000-6004 Active	6003 3410 CORUNNA RD	Commercial	540.89
CORU-003833-0000-01 52544-43643	6000-6004 Active	6003 3833 CORUNNA RD	Commercial	1,430.68
CORU-004014-0000-01 52546-23012	6000-6004 Active	6003 4014 CORUNNA RD	Commercial	850.99
CORU-004108-00#2-02	6000-6004 Active	6003 4108 CORUNNA RD #2	Commercial	466.84
COUE-000903-0000-03	6000-6004 Active	6001 903 E COURT ST	Commercial	1,317.40
COUE-002907-0000-07	6000-6004 Active	6001 2907 E COURT ST	Commercial	600.55
COUE-002931-0000-01 1388-47634	6000-6004 Active	6001 2931 E COURT ST	Commercial	469.59
COUE-003401-0000-02 59371-34563	6000-6004 Active	6001 3401 E COURT ST	Commercial	400.37
COUW-000114-0000-02	6000-6004 Active	6003 114 W COURT ST	Commercial	249.32
COUW-000409-0000-03 21113-32267	6000-6004 Active	6003 409 W COURT ST	Commercial	1,476.72
COUW-002719-0000-02	6000-6004 Active	6003 2719 W COURT ST	Commercial	588.82
DAVI-002132-0000-01 25923-9929	6000-6004 Active	6001 2132 DAVISON RD	Commercial	1,671.01
DAVI-002412-0000-03	6000-6004 Active	6001 2412 DAVISON RD	Commercial	903.29

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
DAVI-002602-0000-05	6000-6004 Active	6001 2602 DAVISON RD	Commercial	574.59
DAVI-002622-0000-02	6000-6004 Active	6001 2622 DAVISON RD	Commercial	576.91
DAVI-003612-0000-03	6000-6004 Active	6001 3612 DAVISON RD	Commercial	384.29
DAVI-003837-0000-03	6000-6004 Active	6001 3837 DAVISON RD D	Commercial	513.91
DAVI-003849-0000-06	6000-6004 Active	6001 3849 DAVISON RD	Commercial	478.29
DEWW-000106-0000-03	6000-6004 Active	6004 106 W DEWEY ST	Commercial	450.29
DEXS-000610-0000-02 59371-38254	6000-6004 Active	6001 610 S DEXTER ST	Commercial	937.13
DORN-002315-0000-02	6000-6004 Active	6001 2315 N DORT HWY	Commercial	557.98
DORN-002429-0000-02	6000-6004 Active	6001 2429 N DORT HWY	Commercial	253.01
DORN-004030-0000-01 52698-33319	6000-6004 Active	6001 4030 N DORT HWY	Commercial	209.44
DORN-004084-0000-02	6000-6004 Active	6001 4084 N DORT HWY	Commercial	319.40
DORN-005201-BACK-03	6000-6004 Active	6001 5201 N DORT HWY BACK	Commercial	1,929.86
DORN-005201-FRON-01 52700-25766	6000-6004 Active	6001 5201 N DORT HWY FRONT	Commercial	370.04
DORN-006515-0000-01 53707-24767	6000-6004 Active	6001 6515 N DORT HWY	Commercial	765.40
DORS-000205-0000-03	6000-6004 Active	6001 205 S DORT HWY	Commercial	1,105.77
DORS-000425-BTLE-01 53712-43824	6000-6004 Active	6001 425 S DORT HWY 2 INCH	Commercial	4,962.62
DORS-000425-DOME-01 52707-29685	6000-6004 Active	6001 425 S DORT HWY DOMEST	Commercial	218.60
DORS-000429-0000-05	6000-6004 Active	6001 429 S DORT HWY	Commercial	820.22
DORS-000822-0000-02	6000-6004 Active	6001 822 S DORT HWY	Commercial	877.52
DORS-001850-0000-02 61751-20799	6000-6004 Active	6002 1850 S DORT HWY	Commercial	357.43

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
DORS-001938-0000-03	6000-6004 Active	6002 1938 S DORT HWY	Commercial	2,504.97
DORS-002052-0000-04	6000-6004 Active	6002 2052 S DORT HWY	Commercial	505.61
DORS-002120-0000-03	6000-6004 Active	6002 2120 S DORT HWY	Commercial	204.95
DORS-002175-0000-02	6000-6004 Active	6002 2175 S DORT HWY	Commercial	419.45
DORS-002201-0000-03 77269-49859	6000-6004 Active	6002 2201 S DORT HWY	Commercial	4,972.44
DORS-002210-0000-05	6000-6004 Active	6002 2210 S DORT HWY	Commercial	470.43
DORS-002211-4 MT-04	6000-6004 Active	6002 2211 S DORT HWY 4 MTR	Commercial	826.08
DORS-002801-0000-02	6000-6004 Active	6002 2801 S DORT HWY	Commercial	4,545.13
DORS-002801-NPIT-02	6000-6004 Active	6002 2801 S DORT HWY N PIT	Commercial	8,203.18
DORS-002801-SPIT-02	6000-6004 Active	6002 2801 S DORT HWY S PIT	Commercial	10,232.14
DORS-002817-0000-01 63002-31198	6000-6004 Active	6002 2817 S DORT HWY	Commercial	302.66
DORS-003021-0000-02	6000-6004 Active	6002 3021 S DORT HWY	Commercial	973.17
DORS-003104-0000-02	6000-6004 Active	6002 3104 S DORT HWY	Commercial	1,350.41
DORS-003110-0000-02	6000-6004 Active	6002 3110 S DORT HWY	Commercial	450.16
DORS-003302-0000-02	6000-6004 Active	6002 3302 S DORT HWY	Commercial	1,519.73
DORS-003559-0000-01 52764-24513	6000-6004 Active	6002 3559 S DORT HWY	Commercial	350.18
DORS-003600-0017-02	6000-6004 Active	6002 3600 S DORT HWY 17	Commercial	723.88
DORS-003760-000C-03	6000-6004 Active	6002 3760 S DORT HWY C	Commercial	491.58
DORS-G03255-0000-02 4968-34971	6000-6004 Active	6002 3255 S DORT HWY	Commercial	497.86
DUP0-001210-0000-01 52793-36659	6000-6004 Active	6004 1210 DUPONT ST	Commercial	1,434.05

ELMS
MHP

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
DUPO-004401-0000-02	6000-6004 Active	6004 4401 DUPONT ST	Commercial	723.79
DUPO-006031-0000-02	6000-6004 Active	6004 6031 DUPONT ST	Commercial	2,663.54
DUPO-006202-0000-02	6000-6004 Active	6004 6202 DUPONT ST	Commercial	2,152.03
FENT-003017-0000-04	6000-6004 Active	6002 3017 FENTON RD	Commercial	1,233.57
FENT-003504-0000-04	6000-6004 Active	6002 3504 FENTON RD	Commercial	271.04
FENT-003522-0000-06	6000-6004 Active	6002 3522 FENTON RD	Commercial	865.35
FENT-004103-0000-01 10887-42776	6000-6004 Active	6002 4103 FENTON RD	Commercial	877.58
FENT-004420-0000-01 52821-32373	6000-6004 Active	6002 4420 FENTON RD	Commercial	470.58
FENT-004627-0000-03	6000-6004 Active	6002 4627 FENTON RD	Commercial	920.32
FENT-004833-0000-03	6000-6004 Active	6002 4833 FENTON RD	Commercial	254.09
FENT-004917-0000-04	6000-6004 Active	6002 4917 FENTON RD	Commercial	235.29
FIFE-000877-BLD -01 52859-38633	6000-6004 Active	6003 877 E FIFTH AVE BLD BC	Commercial	718.57
FIFE-000877-BLDD-01 52856-27157	6000-6004 Active	6003 877 E FIFTH AVE BLDG D	Commercial	5,773.41
FIRE-000300-0000-02	6000-6004 Active	6003 300 E FIRST ST	Commercial	3,352.47
FLIE-000101-0000-01 52880-53483	6000-6004 Active	6004 101 E FLINT PARK BLVD	Commercial	202.78
FLIW-000106-0000-02	6000-6004 Active	6004 106 W FLINT PARK BLVD	Commercial	1,298.51
FLIW-000110-0000-02	6000-6004 Active	6004 110 W FLINT PARK BLVD	Commercial	456.44
FLIW-000711-0000-01 52885-25456	6000-6004 Active	6004 711 W FLINT PARK BLVD	Commercial	984.86
FLOY-001101-0000-03	6000-6004 Active	6004 1101 FLOYD MC CREE DR	Commercial	7,735.56
FLUS-002638-0000-02	6000-6004 Active	6003 2638 FLUSHING RD	Commercial	360.75

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
FLUS-002732-0000-02	6000-6004 Active	6003 2732 FLUSHING RD	Commercial	228.95
FLUS-003202-0000-02	6000-6004 Active	6003 3202 FLUSHING RD	Commercial	464.30
FLUS-003422-0000-01 52900-53070	6000-6004 Active	6003 3422 FLUSHING RD	Commercial	1,560.84
FORE-003202-0000-02	6000-6004 Active	6004 3202 FOREST HILL AVE	Commercial	609.09
GARL-000901-0000-01 52942-8797	6000-6004 Active	6004 901 GARLAND ST	Commercial	900.00
GLEW-001220-0000-05	6000-6004 Active	6003 1220 GLENWOOD AVE	Commercial	984.45
GORE-003716-0000-03	6000-6004 Active	6001 3716 GOREY AVE	Commercial	3,862.62
GORE-003741-0HYD-01	6000-6004 Final Bill	HYD 3741 GOREY AVE HYD	Commercial	773.56
HAME-000340-0000-01 27667-15348	6000-6004 Active	6004 340 E HAMILTON AVE	Commercial	1,222.79
HAME-000765-3 MT-01 52971-49557	6000-6004 Active	6004 765 E HAMILTON AVE 3 MTR	Commercial	5,847.38
HAME-000765-4 MT-01 52970-20759	6000-6004 Active	6004 765 E HAMILTON AVE 4 MTR	Commercial	22,506.84
HAMR-003901-0000-03	6000-6004 Active	<i>Park West Apts</i> 6002 3901 HAMMERBERG RD	Commercial	46,567.10
HEMW-001960-0000-02	6000-6004 Active	6002 1960 W HEMPHILL RD	Commercial	353.41
HOMW-001002-0000-02	6000-6004 Active	6004 1002 W HOME AVE	Commercial	1,085.33
KENT-001525-0000-02	6000-6004 Active	6002 1525 KENT ST	Commercial	351.35
LAKD-003100-0000-01 53054-36519	6000-6004 Active	6002 3100 LAKEWOOD DR MAIN	Commercial	4,715.82
LAPE-003425-0000-09	6000-6004 Active	6002 3425 LAPEER RD	Commercial	2,706.76
LAPE-003430-0000-01 53086-46987	6000-6004 Active	6002 3430 LAPEER RD	Commercial	994.39
LAPE-003501-0000-03	6000-6004 Active	6002 3501 LAPEER RD	Commercial	7,382.65
LAPE-003701-0000-01 53089-20462	6000-6004 Active	6002 3701 LAPEER RD	Commercial	1,212.52

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
LEIT-001900-0000-04	6000-6004 Active	6001 1900 LEITH ST	Commercial	274.30
LIPP-000410-000A-07	6000-6004 Active	6002 410 LIPPINCOTT BLVD A	Commercial	899.78
LIPP-000410-000B-06	6000-6004 Active	6002 410 LIPPINCOTT BLVD B	Commercial	1,084.30
LIPP-000410-000C-06	6000-6004 Active	6002 410 LIPPINCOTT BLVD C	Commercial	994.55
LIPP-002440-0000-02 63653-40423	6000-6004 Active	6002 2440 LIPPINCOTT BLVD	Commercial	849.18
LIPP-002442-0000-01 53113-48879	6000-6004 Active	6002 2442 LIPPINCOTT BLVD	Commercial	922.02
LIPP-002716-0000-02 76058-29270	6000-6004 Active	6002 2716 LIPPINCOTT BLVD	Commercial	702.79
LIPP-002716-MTR2-01	6000-6004 Active	6002 2716 LIPPINCOTT BLVD MTR2	Commercial	4,114.40
LIPP-003113-0000-01	6000-6004 Active	6002 3113 LIPPINCOTT BLVD	Commercial	236.50
LIPP-003807-0000-04	6000-6004 Active	6002 3807 LIPPINCOTT BLVD	Commercial	1,692.29
LIPP-003817-0000-04	6000-6004 Active	6002 3817 LIPPINCOTT BLVD	Commercial	3,401.45
M L -000610-0000-04	6000-6004 Active	6003 610 M L KING AVE	Commercial	3,910.26
M L -000931-0000-02	6000-6004 Active	6003 931 M L KING AVE	Commercial	1,486.60
M L -003114-0000-01 44332-8321	6000-6004 Active	6004 3114 M L KING AVE	Commercial	216.42
M L -003216-0000-01 27890-30623	6000-6004 Active	6004 3216 M L KING AVE	Commercial	260.83
M L -003318-0000-03 76768-51251	6000-6004 Active	6004 3318 M L KING AVE	Commercial	451.94
M L -005901-0000-01 52655-44598	6000-6004 Active	6004 5901 M L KING AVE	Commercial	424.68
MAIN-004303-0000-01	6000-6004 Active	6004 4303 MAINES ST	Commercial	241.41
NEBR-001709-0000-02	6000-6004 Active	6001 1709 NEBRASKA AVE	Commercial	213.89
NORT-005306-0000-02	6000-6004 Active	6004 5306 NORTH ST	Commercial	2,336.40

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
OAK -001000-0000-01	6000-6004 Active	6003 1000 OAK ST	Commercial	3,562.50
ORCH-002706-0000-01 53198-23458	6000-6004 Active	6003 2706 ORCHARD LN	Commercial	2,919.49
ORCH-002720-0000-01 53199-49733	6000-6004 Active	6003 2720 ORCHARD LN	Commercial	1,961.17
ORCH-002729-0000-01 53200-35071	6000-6004 Active	6003 2729 ORCHARD LN	Commercial	419.00
ORCH-002734-MTR1-01 53201-32045	6000-6004 Active	6003 2734 ORCHARD LN MTR #1	Commercial	3,822.66
ORCH-002734-MTR2-01 53202-27167	6000-6004 Active	6003 2734 ORCHARD LN MTR #2	Commercial	1,997.64
OREN-001602-0000-02	6000-6004 Active	6004 1602 OREN AVE	Commercial	497.37
PASW-002213-0000-02	6000-6004 Active	6004 2213 W PASADENA AVE	Commercial	452.32
PENG-004025-0000-02	6000-6004 Active	6002 4025 PENGELLY RD	Commercial	2,523.06
PIEW-000114-0000-01 53237-19928	6000-6004 Active	6004 114 W PIERSON RD	Commercial	318.53
PIEW-001610-0000-01 49093-11646	6000-6004 Active	6004 1610 W PIERSON RD	Commercial	781.16
PIEW-001630-0000-01 49094-39301	6000-6004 Active	6004 1630 W PIERSON RD	Commercial	2,062.95
PIEW-001910-BLG -03	6000-6004 Final Bill	6004 1910 W PIERSON RD BLG K	Commercial	4,681.90
PIEW-002629-0000-02 53261-8492	6000-6004 Active	6004 2629 W PIERSON RD	Commercial	368.59
PROC-004138-0000-03	6000-6004 Active	6004 4138 PROCTOR AVE	Commercial	519.82
RANG-003427-0000-02	6000-6004 Active	6001 3427 RANGELEY DR	Commercial	602.17
RANG-003429-0000-02	6000-6004 Active	6001 3429 RANGELEY DR	Commercial	510.32
RANG-003438-0000-02	6000-6004 Active	6001 3438 RANGELEY DR	Commercial	758.74
RANG-003444-0000-02	6000-6004 Active	6001 3444 RANGELEY DR	Commercial	405.34
RANG-003448-0000-02	6000-6004 Active	6001 3448 RANGELEY DR	Commercial	523.56

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
RANG-003449-0000-02	6000-6004 Active	6001 3449 RANGELEY DR	Commercial	451.27
RANG-003450-0000-02	6000-6004 Active	6001 3450 RANGELEY DR	Commercial	1,239.74
RANG-003454-0000-02	6000-6004 Active	6001 3454 RANGELEY DR	Commercial	559.54
RANG-003455-0000-02	6000-6004 Active	6001 3455 RANGELEY DR	Commercial	670.29
RANG-003457-0000-02	6000-6004 Active	6001 3457 RANGELEY DR	Commercial	629.30
RANG-003505-0000-02	6000-6004 Active	6001 3505 RANGELEY DR	Commercial	772.56
RANG-003509-0000-02	6000-6004 Active	6001 3509 RANGELEY DR	Commercial	490.54
RANG-003519-0000-02	6000-6004 Active	6001 3519 RANGELEY DR	Commercial	493.72
RANG-003531-0000-02	6000-6004 Active	6001 3531 RANGELEY DR	Commercial	736.57
RICH-002804-0000-03	6000-6004 Active	6001 2804 RICHFIELD RD	Commercial	934.09
RICH-002902-0000-01 18941-11559	6000-6004 Active	6001 2902 RICHFIELD RD	Commercial	462.44
RICH-003202-#321-02 56166-2891	6000-6004 Active	6001 3202 RICHFIELD RD #3210	Commercial	493.61
RICH-003202-#322-01 56166-39990	6000-6004 Active	6001 3202 RICHFIELD RD #3220	Commercial	818.81
RICH-003202-#323-02 56166-20586	6000-6004 Active	6001 3202 RICHFIELD RD #3230	Commercial	1,986.46
RICH-003202-#324-02 56166-53650	6000-6004 Active	6001 3202 RICHFIELD RD #3240	Commercial	413.86
RICH-003202-#325-02 56166-29936	6000-6004 Active	6001 3202 RICHFIELD RD #3250	Commercial	1,049.86
RICH-003202-#326-02 56166-4533	6000-6004 Active	6001 3202 RICHFIELD RD #3260	Commercial	4,367.55
RICH-003202-#327-01 56166-30963	6000-6004 Active	6001 3202 RICHFIELD RD #3270	Commercial	1,085.14
RICH-003202-#328-02 56166-1291	6000-6004 Active	6001 3202 RICHFIELD RD #3280	Commercial	429.81
RICH-003538-0000-01 19741-31257	6000-6004 Active	6001 3538 RICHFIELD RD	Commercial	359.93

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
ROBE-004618-0000-03	6000-6004 Active	6004 4618 ROBERTS ST	Commercial	311.53
ROBR-001176-0000-02	6000-6004 Active	6003 1176 ROBERT T LONGWAY	Commercial	514.87
ROBR-003010-0000-04	6000-6004 Active	6001 3010 ROBERT T LONGWAY	Commercial	228.76
ROBR-003842-0000-01 53332-8209	6000-6004 Active	6001 3842 ROBERT T LONGWAY	Commercial	468.37
RUSW-000413-0000-03	6000-6004 Active	6004 413 W RUSSELL AVE	Commercial	538.49
SAGN-002102-0000-02	6000-6004 Active	6004 2102 N SAGINAW ST	Commercial	674.56
SAGN-002120-0000-01 27044-55784	6000-6004 Active	6004 2120 N SAGINAW ST	Commercial	1,270.38
SAGN-002125-0000-01	6000-6004 Active	6004 2125 N SAGINAW ST	Commercial	305.35
SAGN-003517-HALF-01 41537-13364	6000-6004 Active	6004 3517 N SAGINAW ST HALF	Commercial	426.62
SAGN-004250-0000-02 68760-40907	6000-6004 Active	6004 4250 N SAGINAW ST	Commercial	1,499.97
SAGN-004316-0000-08	6000-6004 Active	6004 4316 N SAGINAW ST	Commercial	444.85
SAGN-004414-0000-02	6000-6004 Active	6004 4414 N SAGINAW ST	Commercial	975.06
SAGN-005002-0000-02 75715-2908	6000-6004 Active	6004 5002 N SAGINAW ST	Commercial	491.04
SAGN-005106-0000-02	6000-6004 Active	6004 5106 N SAGINAW ST	Commercial	443.23
SAGN-005533-0000-02 73731-44580	6000-6004 Active	6004 5533 N SAGINAW ST	Commercial	768.73
SAGN-005601-0000-02	6000-6004 Active	6004 5601 N SAGINAW ST	Commercial	684.63
SAGN-005811-0000-01	6000-6004 Active	6004 5811 N SAGINAW ST	Commercial	771.08
SAGN-006201-0000-02 71885-33766	6000-6004 Active	6004 6201 N SAGINAW ST	Commercial	449.09
SAGN-006209-0000-01 36567-49596	6000-6004 Active	6004 6209 N SAGINAW ST	Commercial	279.05
SAGN-006418-0000-02	6000-6004 Active	6004 6418 N SAGINAW ST	Commercial	343.49

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
SAGN-006715-0000-04	6000-6004 Active	6004 6715 N SAGINAW ST	Commercial	300.04
SAGS-000526-0000-03	6000-6004 Active	6003 526 S SAGINAW ST	Commercial	1,040.72
SAGS-000555-0103-03	6000-6004 Active	6003 555 S SAGINAW ST 103	Commercial	441.85
SAGS-000635-0000-01 3421-35467	6000-6004 Active	6003 635 S SAGINAW ST	Commercial	510.32
SAGS-001501-0000-02	6000-6004 Active	6002 1501 S SAGINAW ST	Commercial	620.41
SAGS-001529-0000-01 8530-50453	6000-6004 Active	6002 1529 S SAGINAW ST	Commercial	269.30
SAGS-001602-0000-04	6000-6004 Active	6002 1602 S SAGINAW ST	Commercial	1,111.24
SAGS-002408-0000-01 8412-17096	6000-6004 Active	6002 2408 S SAGINAW ST	Commercial	1,215.97
SAGS-002517-0000-03	6000-6004 Active	6002 2517 S SAGINAW ST	Commercial	1,089.75
SECW-000134-UPPE-01 3533-48771	6000-6004 Active	6003 134 W SECOND ST UPPER	Commercial	555.29
SECW-000142-0000-01 53439-40119	6000-6004 Active	6003 142 W SECOND ST	Commercial	743.79
SECW-000318-0000-03	6000-6004 Active	6003 318 W SECOND ST	Commercial	6,869.74
STEE-001083-0000-01 53475-54037	6000-6004 Active	6004 1083 E STEWART AVE	Commercial	2,076.09
STEE-001401-0000-02	6000-6004 Active	6004 1401 E STEWART AVE	Commercial	1,676.26
STOG-002812-0000-01 52269-3501	6000-6004 Active	FHC Atherton East 2812 STONEGATE DR	Commercial	352.78
STOG-003312-0000-03	6000-6004 Active	Apts 3312 STONEGATE DR	Commercial	3,553.87
STOG-003317-0000-04	6000-6004 Active	3317 STONEGATE DR	Commercial	3,394.73
STOG-003333-0000-04	6000-6004 Active	3333 STONEGATE DR	Commercial	2,196.80
STOG-003409-0000-04	6000-6004 Active	3409 STONEGATE DR	Commercial	10,306.78
STOG-003424-0000-03	6000-6004 Active	3424 STONEGATE DR	Commercial	2,666.64

Location ID Account Number	Cycle Status	Route/Book Service Address	Class	Past Due Amount
STOG-003455-0000-04	6000-6004 Active	6002 3455 STONEGATE DR	Commercial	4,754.29
STOG-003510-0000-03	6000-6004 Active	6002 3510 STONEGATE DR	Commercial	1,289.04
STOG-003534-0000-03	6000-6004 Active	6002 3534 STONEGATE DR	Commercial	5,797.84
STOG-003618-0000-03	6000-6004 Active	6002 3618 STONEGATE DR	Commercial	1,676.98
THOA-002822-0000-01 53512-9694	6000-6004 Active	6003 2822 THOMAS ST	Commercial	1,734.49
TWEW-000719-0000-01 8692-21228	6000-6004 Active	6002 719 W TWELFTH ST	Commercial	386.44
UNIW-001509-0000-01	6000-6004 Active	6003 1509 W UNIVERSITY AVE	Commercial	840.68
VANS-003717-0000-02 70466-37537	6000-6004 Active	6002 3717 VAN SLYKE RD	Commercial	5,731.60
WEBS-001806-0000-04	6000-6004 Active	6001 1806 WEBSTER RD	Commercial	17,795.57
WELC-000830-0000-06	6000-6004 Active	6004 830 WELCH BLVD	Commercial	435.75
WEST-004302-0000-01 53580-20248	6000-6004 Active	<i>Lake side</i> <i>MHR</i> 6001 4302 WESTERN RD	Commercial	6,434.44
WEST-004612-0000-02	6000-6004 Active	6001 4612 WESTERN RD	Commercial	407.84
WEST-004615-0000-01 53582-53556	6000-6004 Active	<i>Shady</i> <i>Acre</i> <i>MHR</i> 6001 4615 WESTERN RD	Commercial	47,695.40
WOOB-000908-0000-03	6000-6004 Active	6003 908 WOODBRIDGE ST	Commercial	1,015.66
WYOM-003641-0000-02	6000-6004 Active	6001 3641 WYOMING AVE	Commercial	977.31

Total: \$544556.87

Report Generated: 3/5/2015 1:15 PM

Report Options: Cycle = 6000-6004; Active, First Bill, and Final Bill Accounts; Non-Bankruptcy Accounts Only

Rennaker, Joanne (DEQ)

From: Wyant, Dan (DEQ)
Sent: Tuesday, October 13, 2015 12:08 PM
To: Krisztian, George (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)
Cc: Sygo, Jim (DEQ); Wurfel, Brad (DEQ)
Subject: FW: Confirmation experiments.
Attachments: Instructions for the Flint School Experiments.docx

Thoughts?

Dan Wyant, Director
 Department of Environmental Quality
 517-284-6700 (New Number)

From: Marc Edwards [<mailto:edwardsm@vt.edu>]
Sent: Tuesday, October 13, 2015 11:53 AM
To: vweiss@grandblancschools.org; emily.cizmas@wayne.edu; Wurfel, Brad (DEQ); Wyant, Dan (DEQ)
Subject: Confirmation experiments.

Vicky, Emily, Brad and Dan

Attached are the instructions for the simple experiments, that we sent out a week ago to illustrate the dramatically higher corrosivity of Flint water versus Detroit water.
 Vicky and Emily's classrooms will be tracking the corrosivity of the water before, during and after the switch is made in the Flint water.
 We will be posting the results with a week lag on our National Science Foundation webpage FLINTWATERSTUDY.org

I sent bottles to Brad at MDEQ, on the off chance MDEQ also wanted to do the test. I initially did this because there was some reluctance to admit that there was a corrosion problem, but I think that is behind us.
 In any case, you might want to do it and see for yourself. This is a simple way to screen corrosivity and corrosion inhibitors, that we routinely do for water utilities in advance of treatment changes.
 The results are very dramatic.

Best Regards,

Marc

Hypothesis: Flint River Water chemistry is more corrosive to lead than Detroit Water

Experimental Materials Needed.

- Jars with lead solder (50% Pb and 50% Sn)
- Treated Flint Water
- Treated Detroit Water

Experimental Set up:

Step 1: Label each jar as either Detroit or Flint (you choose). After labeling **ONLY** put Flint water into the Flint jar and Detroit Water into the Detroit jar, unless you make a change.

- Each student group should have one Detroit jar and one Flint jar
- There should be three extra Flint jars per class room. These jars will continue to be filled with the old Flint water after the city switches their water to Detroit.
This is a **CONTROL** to see what would have happened in Flint water without switching the water source.

Step 2: Purchase 2, 1 gallon containers of **distilled** water at the store, dump it out and fill the container with water from a source that is known to be on the City of Flint water system. Clearly label the container "Flint Water" so you do not get confused.

Step 3: Fill Detroit jars with water from the tap (assuming you have Detroit water) and fill the Flint jars with the water in the Flint water container.

- Each jar should be filled to within 1 cm from the top. After filling the container, screw the top onto the container.

Every Monday/Wednesday/Friday: Observations and "Dump and Fill" Water Changes

- Vigorously swirl each container in order to better visualize the white lead particulates in the water. These particles are coming from the lead solder due to corrosion.
- Visually compare the amount of lead (white suspended material) in the Flint containers with the amount of lead in the Detroit containers. More white particles in water means more lead.
- Take pictures of containers in front of a dark background. *Example of a good picture:*



- Dump out water from each container down the drain. DO NOT DRINK. The water could have high levels of lead.
- Refill the container to simulate water changes in your house. The sitting water in the pipes illustrates what happens when water is not flowing.

Every 2 Weeks: Collect water samples for ICP analysis

- Test tubes will be sent to you every 2 weeks to take samples of the waters
- Label each test tube with your group number, and come up with a code for Detroit or Flint water. That is, Detroit = ZZZ or Flint = AAA, or something like that which you can remember. So a good label is Group1ZZZ for Detroit or Group 1AAA for Flint.
- Vigorously swirl each container before pouring 10 mL of the water into the test tube. Do not allow the lead particles to settle before quickly pouring it into the tube.
- Rinse your hands with clean soap and tap water, if the water sample gets on your hands.
- Water samples will be tested at Virginia Tech and results will be sent back to your lab, with the group number and name of the water sample. We analyze for lead and 30 other elements in water.

Rennaker, Joanne (DEQ)

From: Sygo, Jim (DEQ)
Sent: Monday, October 05, 2015 11:31 AM
To: Busch, Stephen (DEQ)
Subject: FW: Contact at MDHHS/LHD level for water testing planning and process

FYI

From: Wyant, Dan (DEQ)
Sent: Monday, October 05, 2015 11:23 AM
To: Sygo, Jim (DEQ); Krisztian, George (DEQ); Shekter Smith, Liane (DEQ); Pallone, Maggie (DEQ); Wurfel, Brad (DEQ)
Subject: Fwd: Contact at MDHHS/LHD level for water testing planning and process

Sent from my iPhone

Begin forwarded message:

From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: October 5, 2015 at 8:47:33 AM EDT
To: "Wyant, Dan (DEQ)" <WyantD@michigan.gov>
Cc: "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
Subject: FW: Contact at MDHHS/LHD level for water testing planning and process

Good morning, Dan,

Contact for lead testing in water here at MDHHS should be Linda Dykema, but she is on AL today- will try to get a LHD contact for you-

E

From: Miller, Corinne (DHHS)
Sent: Monday, October 05, 2015 8:41 AM
To: Wells, Eden (DHHS); Moran, Susan (DHHS); Miller, Mark (DHHS)
Cc: Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS)
Subject: RE: Contact at MDHHS/LHD level for water testing planning and process

It should be Linda Dykema. Both EPA and DEQ would want her involvement.

From: Wells, Eden (DHHS)
Sent: Sunday, October 04, 2015 5:11 PM
To: Moran, Susan (DHHS); Miller, Mark (DHHS); Miller, Corinne (DHHS)
Cc: Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS)
Subject: Contact at MDHHS/LHD level for water testing planning and process

Hi there,

I just got off the phone with Dan Wyant, as he needed UMSPH contact for the Mayor's TA panel. He was wondering who will be the contacts with DEQ and EPA as water testing proceeds (such as t schools, etc) at either MDHHS and LHD.

I am assuming that Linda Dykema would be the one for us (and she was on their organizing call)- Corinne agree?

Mark, are you planning on talking to Mark Valacek tomorrow---I heard you were out, so wondered if you wanted myself or Sue to do so.

Actually, i think there will be a number of issues to coordinate with him tomorrow, so forgive me if I am getting in the middle, just wanted to relay the questions Dan had.

Eden

Rennaker, Joanne (DEQ)

From: Shekter Smith, Liane (DEQ)
Sent: Friday, October 09, 2015 8:09 AM
To: Prysby, Mike (DEQ); Rennaker, Joanne (DEQ); Rosenthal, Adam (DEQ); Butler, Sonya (DEQ); Benzie, Richard (DEQ); Busch, Stephen (DEQ); Cook, Pat (DEQ)
Cc: Devereaux, Tracy Jo (DEQ)
Subject: FW: Daily updates

Importance: High

FYI – I'll need a daily summary by 4:00pm (4:15pm at the latest) of all work efforts as described below.

Be sure to cc Tracy Jo so that one of us will be able to forward it to George by the 4:30pm deadline.

Thanks!

From: Krisztian, George (DEQ)
Sent: Friday, October 09, 2015 7:07 AM
To: Shekter Smith, Liane (DEQ)
Cc: Thelen, Mary Beth (DEQ); Shaler, Karen (DEQ); Wyant, Dan (DEQ); Sygo, Jim (DEQ)
Subject: Daily updates
Importance: High

Hi Liane,

The Governor wants daily updates regarding the progress we are making on the Flint issue. Can you please provide me with a summary of the action steps that we have taken on a daily basis? The summary should not contain excessive detail, it should be something like:

- Steve Busch contacted Natasha Henderson at the City of Flint to get details on supplemental Phosphate Dosing
- Pat Cook/Mike P Analyzed Plans for flushing and pressure testing lines to make the switch back to GLWA
- Met with city of Flint officials to review actions to date and to create a list of next steps

The above examples are for illustrative purposes only

I need to have this summary each day no later than 4:30 PM. This is a hard deadline as we need to get the summary to the Governor by 5:00 PM. Please make sure that you copy Mary Beth and Karen.

Thank you!
George

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Monday, June 22, 2015 8:36 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Cc: Shekter Smith, Liane (DEQ); Poy, Thomas; Deltoral, Miguel; Bair, Rita
Subject: FW: Darren Lytle's Bio
Attachments: Lytle Resume 2015.pdf

Hi, Steve and Mike. To follow up from our semi-annual call in which we discussed Flint issues and lead in the distribution system, I am forwarding you Darren Lytle's resume. Darren 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 don't think we have seen the last of problems with the distribution system. I hope you will take advantage of his technical expertise. His contact information is on the attached resume. If you have questions about Darren, please contact Miguel at 312.886.5253.

Jennifer

From: Deltoral, Miguel
Sent: Friday, June 19, 2015 5:53 AM
To: Crooks, Jennifer
Cc: Poy, Thomas; Bair, Rita; Porter, Andrea; Kuefler, Janet
Subject: Darren Lytle's Bio

Here's Darren's Bio for MDEQ.

Miguel A. Del Toral
 Regulations Manager
 U.S. EPA R5 GWDWB
 77 West Jackson Blvd, (WG-15J)
 Chicago, IL 60604
 Phone: (312) 886-5253

DARREN A. LYTLE

U.S. Environmental Protection Agency
 Cincinnati, OH 45268
 (513) 569-7432 Phone (513) 487-2543 FAX
 lytle.darren@epa.gov

Education

Ph.D., Environmental Engineering
 University of Illinois at Champaign-Urbana, Champaign, Illinois, December
 19, 2005
 Advisor: Prof. Vernon Snoeyink
 Dissertation: "The Effect of Water Chemistry on Iron Particles and
 Suspensions"

Master of Science, MS, Environmental Engineering
 University of Cincinnati, Cincinnati, Ohio, 1991
 Advisor: Prof. R. Scott Summers
 Thesis: "Removal of Beryllium from Drinking Water by Chemical
 Coagulation and Lime Softening"

B.S., Civil Engineering
 University of Akron, Akron, Ohio, 1990

Registration

Professional Engineer, Ohio, No. E-61725

Experience

U.S. Environmental Protection Agency (EPA)
 Office of Research and Development (WSWRD)
 Treatment Technology Evaluation Branch (TTEB)
 Water Supply and Water Resources Division
 26 W. Martin Luther King Dr.
 Cincinnati, Ohio 45268

Supervisory Environmental Engineer (Branch Chief, Acting) (May 2012 to present). See below for duties.

Environmental Engineer (GS-14 National Expert) (March 2012 to May 2012).
 See below for duties.

Supervisory Environmental Engineer (Branch Chief, Acting) (March 2010 to March 2012). Oversees and manages Branch within WSWRD's Treatment, Technology and Evaluation Branch (TTEB). Branch consists as many as twenty-four federally-employed engineers, chemists, and technicians. The Branch conducts drinking research in support of the development of new and previously promulgated Federal drinking water standards. Serves as first line supervisor for a staff of engineers, scientist and technicians. Provides direction, guidance, advice and assistance to Branch staffing all administrative matters and in technical matters, as appropriate; sets priorities for Branch products within research plans; assigns staff, evaluated performance; resolves complaints and disputes within the Branch; handles appropriate personnel actions and issues, including recommending promotions, approving leave and interviewing and recommending candidates for positions within the Branch.

Environmental Engineer (GS-14 National Expert) (June 2009 to March 2010). See below for duties.

Supervisory Environmental Engineer (Branch Chief, Detail) (February 2009 to June 2009). Oversees and manages Branch within WSWRD's Treatment, Technology and Evaluation Branch (TTEB). Branch consists of twenty-four federally-employed engineers, chemists, and technicians, and a number of contractors. The Branch conducts drinking research in support of the development of new and previously promulgated Federal drinking water standards.

Environmental Engineer, National Expert (GS-14) (January 2005 to February 2009). Serves as a nationally and Agency recognized researcher on water treatment and distribution system issues including corrosion control, inorganic contaminant and pathogen control, and biological water treatment. Provides extensive research and technical assistance to EPA for the development and implementation of drinking water rules and regulations. Activities include addressing scientific peer panels like the Science Advisory Board with the results of my research, and participating on EPA workgroups and committees that develop guidelines and policies that the Agency issues to the water treatment utilities for achieving safe drinking water. Plans, directs, and participates in an in-house and extramural (grants/contracts) research program focused on corrosion control, inorganic contaminant and pathogen control, and biological water treatment. Research efforts are integrated into WSWRD, Regional and Program goals and needs. As the nationally recognized researcher, author authoritative scientific papers on research results in peer reviewed professional journals and writes chapters in technical manuals and books. Presents results of research at National Conferences, workshops, symposia and meetings. Organizes and moderates sessions at national

conferences, etc., sponsored by various groups on topics of his special expertise. Called upon by other EPA programs, and organizations such as the Office of Water, various Regional Offices to participate in seminars and workshops.

Environmental Engineer (1990 to November 7, 2008). Plan, design, and conduct in-house and field research on the removal and control of inorganic contaminants such as turbidity, metals and radionuclides, and microorganisms from drinking water using treatment strategies such as conventional coagulation and filtration, slow sand filtration, ion exchange, membrane filtration, and lime softening. Also, address residuals management concerns related to water treatment processes. Plan, design, and conduct in-house and field research on corrosion control of drinking water distribution system materials including lead, copper, brass, and iron. Develop and utilize computer programs related to water chemistry modeling, and statistical and graphical analysis of research data collected from corrosion control and water treatment studies. Present and publish research findings in peer reviewed literature, at conferences, and other outlets. Provide technical assistance to other EPA offices, Federal, State, and Local agencies, consultants, and utilities in the water supply industry. Manage Co-operative Agreements and other mechanisms of extramural funding.

Affiliations

Member of American Water Works Association (AWWA), 1991 to present

Member of Sigma Xi Scientific Research Society, 1997 to present

Committees (Outside of EPA)

Journal of the American Water Works Association (Jour. AWWA), member of the Journal's Editorial Board, April 2015 to present.

American Water Works Association Biological Treatment Symposium Planning Committee, 2012.

American Water Works Association Biological Water Treatment Water Quality Committee, Nov. 2008-present.

American Water Works Association Drinking Water Research Division, June 2007-2013.

American Water Works Association Drinking Water Distribution System Research Committee, 2006-present.

American Water Works Association Small Systems Research Committee, 2007 to present.

American Water Works Research Foundation (AWWARF) Project Advisory Committee member on project #4103: Comparison of Zinc vs. Non-zinc Corrosion Control for Lead and Copper, 2007-present

American Water Works Research Foundation (AWWARF) Project Advisory Committee member on project #3109: Copper Pitting Monitoring Techniques, 2005-present

American Water Works Research Foundation (AWWARF) Project Advisory Committee member on project titled: "Long-term Effects of Disinfection Changes on Water Quality", March 2003-2007.

American Water Works Research Foundation (AWWARF) Project Advisory Committee member on project titled: "Optimizing the Generation and Capacity of Adsorptive Sites on Oxide Surfaces for Manganese Control", March 2003-2007.

Chairman of AWWA Research Foundation Distribution System Technical Advisory Workgroup, 2000.

American Water Works Research Foundation (AWWARF) Project Advisory Committee member on project titled: "Post-Optimization of Lead and Copper Control Monitoring Strategies", 2000-2004.

American Water Works Research Foundation (AWWARF) Project Advisory Committee member on project titled: "Process Performance Indicators for Arsenic Removal", 2000-2004.

American Water Works Research Foundation (AWWARF) invited participant on Manganese Research Needs Workshop, Voorhees, New Jersey, January 9-10, 2001.

Standard Methods Committee on revisions to method Section 2120 Color, 1999. Taught graduate level course on drinking water treatment at the University of Cincinnati, 2000.

Peer Reviewer

Journal of Hazardous Waste
Journal of Environmental Engineering
Environmental Science and Technology
Journal of Water Supply: Research and Technology: AQUA
Journal AWWA

Environmental Monitoring and Assessment

Honors and Awards

- 2013 U.S. EPA/ORD Scientific and Technological Achievement Award, Honorable Mention, for the paper "Lead Pipe Scale Analysis Using Broad-Beam Argon Milling to Elucidate Drinking Water Corrosion".
- 2013 U.S. EPA/ORD Scientific and Technological Achievement Award, Honorable Mention, for the paper "Multifunctional Silver Coated E-33/Iron Oxide Water Filters: Inhibition of Biofilm Growth and Arsenic Removal".
- 2011 U.S. EPA achievement award, the Bronze Medal Award for acting as a Project Lead Safe and Sustainable Water Resources (SSWR) under ORD's Strategic Research Action Plans and Research Action Plan Teams
- 2011 U.S. EPA/ORD Scientific and Technological Achievement Award, Level III, for the book chapter: "Chapter 20: Internal Corrosion and Deposition Control Peer-reviewed book. Water Quality and Treatment: A Handbook of Community Water Supplies. Sixth ed. J.K. Edzwald, editor, (2010)"
- 2008 U.S. EPA NRMRL Honor Award "Arsenic Removal Technology Demonstration Project"
- 2000 U.S. EPA achievement award, the Bronze Medal Award, as part of Low Flow Drinking Water Pilot Plant Team.
- 1999 U.S. EPA achievement award, the Bronze Medal Award, for "A method for assaying a microbial surrogate for evaluating drinking water performance".
- 1998 U.S. EPA/ORD Scientific and Technological Achievement Award, Level III, for the paper "Application of Aeration to Reduce Lead and Copper in Waters with Suitable pH and Carbon Dioxide".
- 1997 Awarded an Internal Grant an Investigation, "The Surface Properties of Microbiological Pathogens in Drinking Water".
- 1997 U.S. EPA's highest achievement award, the Gold Medal Award, as part of the "District of Columbia Drinking Water Core Team". Provided technical assistance to the District of Columbia during a bacterial problem within their distribution system.
- 1994 U.S. EPA's highest achievement award, the Gold Medal Award, for investigative work and technical assistance to the City of Milwaukee, WI., during their Waterborne Cryptosporidiosis Outbreak in 1993.

- 1993 U.S. EPA/ORD Scientific and Technological Achievement Award, Level 1, for the paper "Beryllium Determination in Drinking Water by Graphite Furnace Atomic Absorption Spectroscopy (GFAAS)", *Jour. AWWA*.
- 1993 U.S. EPA/RREL STAR program publication award for the paper, "Removal of Beryllium by Chemical Coagulation and Lime Softening", *J Water SRT-Aqua*.
- 1993 U.S. EPA/RREL STAR program publication award for the paper, "Preferential Dissolution of Lead from Solder Particulate Material", *Jour. AWWA*.

Bibliography: Darren A. Lytle

updated: May 2015

PEER-REVIEWED PUBLICATIONS (* denotes corresponding author)

Lytle, D.A.*, Williams, D., Muhlen, M., Pham, M., Kelty, K., Wildman, M., Lang, G., Wilcox, M., and M. Kohne. **An Innovative Biological Ammonia Treatment Process: Pilot to Full-Scale**. Submitted to *Jour AWWA* (May 2015).

Minning, T., **Lytle, D.A.***, Pham, M., and K. Kelty. **Systematic Evaluation of Dissolved Lead Sorption Losses to Particulate Syringe Filter Materials**. Accepted for publication in *Environ. Monitor. Assess.* (May 2015).

(70) White, C.P., Desai, V., Riddick, E., Popovici, J. and **D.A. Lytle**. **Identification of Arsenic-Oxidizing Bacteria Isolated from Biologically-Active Rapid Sand Filter**. Accepted for publication in: *Systematic and Applied Microbiology*. 2014.

Lytle, D.A., Fox, K., Miltner, R., Speth, T., Schock, M., Kropp, K., Shukairy, H., Fichter, L., Dugan, N., and C. Muhlen. **Water Treatment Pilot Plant Design Manual: The Design of a Low Flow Conventional/Direct Filtration Water Treatment Plant for Drinking Water Treatment Studies**. EPA/600/R-15/045, Office of Research and Development, Cincinnati, Ohio (2015).

Popovici, J., White, C.P., Hoelle, L., and D.A. Lytle*. **Characterization of the Cell Surface Properties of Drinking Water Pathogens by Microbial Adhesion to Hydrocarbon and Electrophoretic Mobility Measurements.** *Colloids and Surfaces B: Biointerfaces*, 118:126-132 (2014).

White, C., J. Popovici, D.A. Lytle, and E. Rice. **Endospore surface properties of commonly used *Bacillus anthracis* surrogates vary in aqueous solution.** *Antonie van Leeuwenhoek*, 106:243-251 (2014).

Lytle, D.A.* and C. White. **The Effect of Phosphate on the Properties of Copper Drinking Water Pipes Experiencing Localized Corrosion.** *J Fail. Anal. and Preven.*, DOI 10.1007/s11668-014-9786-6 (2014).

Copeland, A. and D.A. Lytle*. **Oxidation-Reduction Potential Measurements of Important Oxidants In Drinking Water.** *Jour. AWWA*, 106:1:E10-E20 (<http://dx.doi.org/10.5942/jawwa.2014.106.0002>) (2014).

Sun, H. S., Shi, B., Lytle, D.A., Bai, Y., Wang, D., and M. Ying. **Formation and Release Behavior of Iron Corrosion Products under the Influence of Bacterial Communities in a Simulated Water Distribution System.** *Environ Sci Process Impacts*, 26:16 (3):576-85 (2014).

Lytle, D.A.*, Sorg, T., Wang, L., and A. Chen. **The Accumulation of Radioactive Contaminants in Drinking Water Distribution Systems.** *Water Research*, 50:1:396-407 (2014).

Daniels, S. L., Sprunger, P. A., Kizilkaya, O., Lytle D. A., and J.C. Garno. **Nanoscale Surface Characterization of Aqueous Copper Corrosion: Effects of Immersion Interval and Orthophosphate Concentration.** *Applied Surface Science*, 285:823-831 (2013).

Lytle, D.A.*, White, C., Williams, D., Koch, L., and E. Nauman. **Innovative Biological Water Treatment for the Removal of Elevated Ammonia.** *Jour. AWWA*, 105:9:E524-E539 (<http://dx.doi.org/10.5942/jawwa.2013.105.0109>) (2013).

Haas, C., Koch, L., Kelty, K., Triantafyllidou, S., and D.A. Lytle*. **Effectiveness of the Preservation Protocol within EPA Method 200.8 for Soluble and Particulate Lead Recovery in Drinking Water.** U.S. EPA, Office of Research and Development, Cincinnati, Ohio, EPA/600/R-13/222 (2013)

Lytle, D.A.*, White, Williams, D., Koch, L., and E. Nauman. **Innovative Biological Water Treatment for the Removal of Elevated Ammonia.** *Jour. AWWA*, 105:9:E524-E539 (<http://dx.doi.org/10.5942/jawwa.2013.105.0109>) (2013).

Yeuell, H.D., Dvorak, B.I., P.L. Gurian, and D.A. Lytle. **Committee Report: Getting**

Information to Small Systems: Information Dissemination Survey of Engineers and Regulators. *Jour. AWWA*, 105(1):51-59 (2013).

Henrie, T., Rezania, L.W., Nagy, D, and **D.A. Lytle**. **Got Ammonia?** *AWWA OPFLOW* (2012).

White, C., Popovici, J., **Lytle, D.A.**, Adcock, N., and E.W. Rice. **Effect of pH on the Electrophoretic Mobility of Surrogate Spores of Bacillus anthracis in Aqueous Solutions.** *Appl. Environ. Microbiol.*, 78(23):8470 (2012).

Lytle, D.A.*, White C., Williams, D., Koch, L., and E. Nauman. **Summary Report: Results from the Pilot Study of an Innovative Biological Treatment Process for the Removal of Ammonia from a Small Drinking Water System in Iowa.** U.S. EPA, Office of Research and Development, Cincinnati, Ohio, EPA/600/R-12/655 (2012).

White, C.P., DeBry, R.W., and **D.A. Lytle**. **Microbial Ecology of a Full-Scale Biologically Active Filter for Drinking Water Treatment.** *Appl. Environ. Microbiol.*, 78(17):6390 (2012).

Nadagouda, M.N., Bennett-Stamper, C., White, C., and **D.A. Lytle**. **Multifunctional Silver Coated E-33/Iron Oxide Water Filters: Inhibition of Biofilm Growth and Arsenic Removal.** *RSC Advances*, 2:4198–4204 (2012).

Blute, N, Ghosh, A., and **D.A. Lytle**. **Assessing Ammonia Treatment Options.** *Opflow Online*, American Water Works Association, Denver, CO, 38(5):14-17 (2012).

Lytle, D.A.*, Williams, D., and C. White. **A Simple Approach to Assessing Copper Pitting Corrosion Tendencies and Developing Control Strategies.** *Jour. Wat. Supply: Res. and Tech.:AQUA*, 61(3):164-175 (2012).

Grace, S., **Lytle, D.A***, and M. N. Goltz. **Control of New Copper Corrosion in High-Alkalinity Drinking Water Using Orthophosphate.** *Jour. AWWA*, 104:1:E15-E25 (2012).

White, C., Tancos, M., and **D.A. Lytle**. **Microbial Community Profile of a Lead Pipe Removed from a Drinking Water Distribution System.** *Appl. Environ. Microbiol.*, 77:15:5557-5561 (2011).

Nadagouda, M.N., Cruz, C., and **D.A. Lytle**. **Microwave-Assisted Combustion Synthesis of Nano Iron Oxide/Iron-Coated Activated Carbon, Anthracite, Cellulose Fiber and Silica, with Arsenic Adsorption Studies.** *Journal of Nanotechnology*, vol. 2011, Article ID 972486, 8 pages, 2011. doi:10.1155/2011/972486 (2011).

Lewendowski, B.R., Lusker, K.L., LeJeune, Z.M., **Lytle, D.A.**, Zhou, P., Sprunger, P.T., and J.C. Garno. **Impact of pH, Dissolved Inorganic Carbon, and Polyphosphates for the Initial Stages of Water Corrosion of Copper Surfaces.** *Chem.*, 1:1:16-26 (2011).

- Branhuber, P., De Haan, M., Lemieux, F., and D.A. Lytle. **Recent Research Every Utility Manager Needs to Know About: Rethinking Ammonia Removal Technologies.** *Jour. AWWA*, 103:1:48-59 (2011).
- Nadagouda, M. N., White, C., and D.A. Lytle. **Lead Pipe Scale Analysis Using Broad-Beam Argon Ion Milling to Elucidate Drinking Water Corrosion.** *Micro. and Microanal.*, 17, 284–291, (Feb. 2011).
- Turek, N.F., Kasten, L., Lytle, D.A.*, and M.N. Goltz. **Impact of Plumbing Age on Copper Levels in Tap Water.** *Jour. Wat. Supply: Res. and Tech.:AQUA*, 60:1:1–15 (2011).
- Lewandowski, B., Lytle, D.A., and J.C. Garino. **Nanoscale Investigation of the Impact of pH and Orthophosphate on the Corrosion of Copper Surface in Water.** *Langmuir*, 26:18:14671-14679 (2010).
- Lytle, D.A.*, White, C., and M.N. Nadagouda. **A Comprehensive Investigation of Copper Pitting Corrosion in Drinking Water Distribution System.** *Corrosion Science*, 52:6:1927-1938 (2010).
- Lytle, D.A.*, Sorg, T.J, Muhlen, C., and L. Wang. **Particulate Arsenic Release in a Drinking Water Distribution System.** *Jour. AWWA*, 102:3:87-98 (2010).
- Lytle, D.A.*, M.R. Schock and K. Sheckel. **The Inhibition of Pb(IV) Oxide Formation in Chlorinated Water by Orthophosphate.** *Env.Sci.&Tech*, 43:17:6624-6631 (July, 2009).
- Nadagouda, M., Schock, M., Metz, D. H., Desantis, M., Lytle, D.A. and M.M. Welch. **Effect of Phosphate Inhibitors on the Formation of Lead Phosphate/Carbonate Nanorods, Microrods and Dendritic Structures.** *Crystal Growth & Design*, 9:4:1798-1805 (2009).
- Lytle, D.A.*, White, C., M. N. Nadagouda, and A. Worrall. **Crystal and Morphological Phase Transformation of Pb(II) to Pb(IV) in Chlorinated Drinking Water.** *Journal of Hazardous Materials*, 165:1:1234-1238 (2009).
- Lytle, D.A.*, White, C., and M.R. Schock. **The Synthesis of Lead Pyrophosphate, $P_2P_2O_7$, in Water.** *Micro. and Microanal.*, 14:4:335-341 (2008).
- Lytle, D.A.* and M.R. Schock. **Pitting Corrosion of Copper in High pH and Low Alkalinity Waters.** *Jour. AWWA*, 100:3:115-128 (2008).
- Lytle, D.A.*, Chen, A.S., Sorg, T.J., Phillips, S. and K. French. **Biological As(III) Oxidation in Water Treatment Plant Filters.** *Jour. AWWA*, 99:12:72-86 (2007).

Lytle, D.A.*, Sorg, T.J., Wang, L., Muhlen, C., Rahrig, M., and K. French. **Biological Nitrification in Full-Scale and Pilot-Scale Iron Removal Drinking Water Treatment Plant Filters.** *Jour. Wat. Supply: Res.and Tech.:AQUA*, 56:2:125-136 (2007).

Copeland, R.C., **Lytle, D.A.***, and D.D. Dionysiou. **Desorption of Arsenic from Drinking Water Distribution System Solids.** *Environ. Monit. Assess.*, 127:523-535 (On-line Issn. 0167-6369, Oct. 11, 2006) (2007).

Creed, P.A., Gallawa, C.M., Young, A.R., Schwegel, C.A., **Lytle, D.A.**, Sorg, T.J., and J.T. Creed. **Investigation of Sequential and Enzymatic Extraction of Arsenic from Drinking Water Distribution System Solids using ICP-MS.** *J. Environ. Monit.*, 8:968-972 (2006).

Burlingame, G.A., **Lytle, D.A.**, and V.L. Snoeyink. **Red Water: Understanding Iron Release.** *Opflow*, 32:12 (2006).

Hoffman, G.L. **Lytle, D.A.**, Sorg, T.J., Chen, A.S.C., and L. Wang. **Design Manual: Removal of Arsenic from Drinking Water Supplies by Iron Removal Process.** U.S. EPA, Office of Research and Development, Cincinnati, Ohio, EPA/600.R-06/030 (2006).

Lytle, D.A.* and M.R. Schock. **Formation of Pb(IV) Oxides in Chlorinated Water.** *Jour. AWWA*, 97:11:102-114 (2005).

Schock, M.R., **Lytle, D.A.**, Sandvig, A.M., Clement, J., and S.H. Harmon. **Replacing Polyphosphates with Silicate to Solve Lead, Copper, and Source Water Iron Problems.** *Jour. AWWA*, 97(11):84 (2005).

Lytle, D.A.*, Gerke, T.L., and J.B. Maynard. **Effect of Bacterial Sulfate Reduction on Iron-corrosion Scales.** *Jour. AWWA* 97:10:109-120 (2005).

Lytle, D.A.*, Sorg, T.J., and V.L. Snoeyink. **Optimizing Arsenic Removal During Iron Removal: Theoretical and Practical Considerations.** *Jour. Wat. Supply: Res.and Tech.:AQUA*, 54:545-560 (2005).

Lytle, D.A.*, Sorg, T.J., and C. Frietch. **The Accumulation of Arsenic in Drinking Water Distribution Systems.** *Env.Sci.&Tech.* 38:20:5365-5372 (2004).

Lytle, D.A.*, Frietch, C., and T. Covert. **The Electrophoretic Mobility of Mycobacterium avium Complex (MAC) Organisms in Water.** *Appl. Environ. Microbiol.*, 70:9:5667-5671 (2004).

Lytle, D.A.* and V.L. Snoeyink. **The Effect of Oxidant on the Properties of Fe(III) Particles and Suspensions Formed from the Oxidation of Fe(II).** *Jour. AWWA*, 96:8:112-124 (2004).

Lytle, D.A.*, Sarin, P. and V.L. Snoeyink. **The Effect of Chloride and Orthophosphate on the Release of Iron from a Drinking Water Distribution System Cast Iron Pipe.** *Jour. Wat. Supply: Res.and Tech.:AQUA*, 54:5:267-281 (2004).

Sarin, P., Snoeyink, V. L., **Lytle, D. A.** and W.M. Kriven. **Iron Corrosion Scales: Model for Scale Growth, Iron Release and Colored Water Formation.** *Jour. Environ. Eng.*, 130: 64-373 (2004).

Lytle, D.A.* and V.L. Snoeyink. **The Effect of Dissolved Inorganic Carbon on the Properties of Iron Colloidal Suspensions.** *Jour. Wat. Supply: Res.and Tech.:AQUA*, 52:3:165-180 (2003).

Lytle, D.A.* and V.L. Snoeyink. **Effect of Ortho- and Polyphosphates on the Properties of Iron Particles and Suspensions.** *Jour. AWWA*, 94:10:87-99 (2002).

Lytle, D.A.*, Johnson, C.H., and E.W. Rice. **A Systematic Comparison of the Electrokinetic Properties of Environmentally Important Microorganisms in Water.** *Colloids and Surfaces B:Biointerfaces*, 24:91-101 (2002).

Magnuson, M.L., **Lytle, D.A.**, Frietch, C.M., and C.A. Kelty. **Characterization of Submicrometer Aqueous Iron(III) Colloids Formed in the Presence of Phosphate by Sedimentation Field Flow Fractionation with Multiangle Laser Light Scattering Detection.** *Anal. Chem.*, 2001, 73, 4815-4820.

Sarin, P., Bebee, J., Beckett, M.A., Jim, K.K., **Lytle, D.A.**, Clement, J.A., Kriven W.M., and V. L. Snoeyink. **Mechanism of Release of Iron from Corroded Iron/Steel Pipes in Water Distribution Systems,** *Corrosion & Materials*, 26:3 (2001).

Lytle, D.A.* and M.R. Schock. **Impact of Stagnation Time on Metal Dissolution from Plumbing Materials in Drinking Water.** *Jour. Wat. Supply: Res.and Tech.:AQUA*, 49:10:243-257 (2000).

Lytle, D.A.*, Rice, E.W., Johnson, C.H., and K.R. Fox. **Electrophoretic Mobility of *Escherichia coli* 0157:H7 and Wild-Type *Escherichia coli* Strains.** *Appl. Environ. Microbiol.*, 65:7:3222-3225 (1999).

Sorg, T.J., Schock, M.R., and **D.A. Lytle.** **Ion Exchange Softening: Effects on Metal Concentrations.** *Jour. AWWA*, 91:8:85-97 (1999).

Lytle, D.A.* and M.R. Schock. **The Use of Aeration for Corrosion Control.** *Jour. AWWA*, 90:3:74-88 (March, 1998). Erratum, *Jour. AWWA*, 90:5:4 (1998).

Lytle, D.A.* and M.R. Schock. **An Investigation of the Impact of Alloy Composition and pH**

on the Corrosion of Brass in Drinking Water. *Advance in Environmental Research*, 1:2:213 (1997).

Lytle, D.A.*, Schock, M.R., and T.J. Sorg. **Controlling Lead Corrosion in the Drinking Water of a Building by Orthophosphate and Silicate Treatment.** *Jour. NEWWA*, 110:3:202 (1996).

Fox, K.R. and D.A. Lytle. **The Milwaukee Cryptosporidiosis Outbreak: Investigation and Recommendations.** *Jour. AWWA*, 88:9:87-94 (1996).

Rice, E.W., Fox, K.R., Miltner, R.J., Lytle, D.A., and C.H. Johnson. **Evaluating Water Treatment Performance Using a Microbial Surrogate System.** *Jour. AWWA*, 88:9:122-130 (1996).

Lytle, D.A.* and M.R. Schock. **Stagnation Time, Composition, pH, and Orthophosphate Effects on Metal Leaching on Brass.** U.S. EPA, Office of Research and Development, Cincinnati, Ohio, EPA/600/R-96/103 (1996).

Schock, M.R., Lytle, D.A., and J.A. Clement. **Effect of pH, DIC, Orthophosphate, and Sulfate on Drinking Water Cuprosolvency.** U.S. EPA, Office of Research and Development, Cincinnati, Ohio, EPA/600/R-95/085 (1995).

Vita_s, A., Gardels, M.C., Lytle, D.A., Schock, M.R., and T.J. Sorg. **Investigation of the Electrochemical Properties of Copper in Potable Water.** *Latvijas Kimijas Zurnals*, 1:66-77 (1994).

Lytle, D.A.*, Schock, M.R., Dues, N., and P. Clark. **Preferential Dissolution of Lead from Solder Particulate Material.** *Jour. AWWA*, 85:7:104-110 (July, 1993).

Lytle, D.A.*, Schock, M.R., Doerger, J.U., and N. Dues. **Beryllium Determination of Beryllium in Drinking Water by Graphite Furnace Atomic Absorption Spectroscopy (GFAAS).** *Jour. AWWA*, 85:2:77-83 (Feb., 1993).

Lytle, D.A.*, Summers, R.S., and T.J. Sorg. **Removal of Beryllium by Chemical Coagulation and Lime Softening.** *Jour. Wat. Supply: Res.and Tech.:AQUA*, 41:6:330-339 (1992).

Sorg, T.J. and D.A. Lytle. **Uranium Removed by Ion Exchange.** *Water Environment and Technology*, 4:8:14 (1992).

BOOK CHAPTERS

Schock, M. R. and **D.A. Lytle** (2009). Internal Corrosion and Deposition Control. Water Quality and Treatment: A Handbook of Community Water Supplies. Chapter 20. New York, McGraw-Hill, Inc.: In Review.

Water Dictionary (AWWA2009), Technical Advisory

FACT SHEETS AND SCIENCE BRIEFS

An Innovative Biological Treatment Process for the Removal of Ammonia from a Small Drinking Water System, Latham, M and Lytle, D.A. U.S. Environmental Protection Agency, Cincinnati, OH, ORD EPA/600/F-12/609, Sept. 2012.

A Systematic Evaluation of Dissolved Metals Loss During Water Sample Filtration Latham, M. and Lytle, D. (2011). U.S. Environmental Protection Agency, Washington, EPA/600/F-11/029.

Advanced Materials and Solids Analysis Research Core (AMSARC) Fact Sheet, Latham, M. and Lytle, D. (May 2011). U.S. Environmental Protection Agency, Washington, EPA/600/F-11/007.

Impact of Water Chemistry on the Localized Corrosion of Copper Pitting Latham, M. and Lytle, D. (Oct. 2009). U.S. Environmental Protection Agency, Washington, EPA/600/F-09/013.

In-House Copper and Lead Solubility and Corrosion Studies Latham, M. and Lytle, D. (Oct. 2009). U.S. Environmental Protection Agency, Washington, EPA No. 600/F-09/011.

The Effect of Oxidant and Redox Potential on Metal Corrosion in Drinking Water. Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, DC, EPA/600/F-10/003.

Desorption of Arsenic from Drinking Water Distribution System Solids. Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, EPA/600/F-10/002.

Assessment of Nitrification in Distribution Systems of Waters with Elevated Ammonia Levels. Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, EPA/600/F-10/001, 2010.

The Role of Microbial Processes in the Oxidation and Removal of Arsenic from Drinking Water. Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, EPA/600/F-10/008.

The Role of Microbial Processes in the Oxidation and Removal of Ammonia from Drinking Water. Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, EPA/600/F-10/007.

Relationship Between Redox Potential, Disinfectant, and pH in Drinking Water. Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, EPA/600/F-10/006.

The Effect of Water Chemistry on the Removal of Arsenic from Drinking Water During Iron Removal Treatment Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, EPA/600/F-10/005.

The Effect of Water Chemistry on the Release of Iron from Pipe Walls Latham, M. and Lytle, D. (2010). U.S. Environmental Protection Agency, Washington, EPA/600/F-10/004.

NEWSLETTER/ARTICLE

Problems with Pinhole Leaks in Your Copper Water Pipes - Science Matters Newsletter, U.S. Environmental Protection Agency, Volume 2| Number 2 (March/April 2011).

PRESENTATIONS

(* denotes conference-invited speaker, speaker when listed as first author unless otherwise noted)

Dugan, N., Sanan, T., Smith, S., Marsh, R., Mash, H., and **D.A. Lytle**. “**USEPA Research Update: Brief Recap- Permanganate Oxidation- Preliminary Results- 2015 Bloom Season Monitoring- Preliminary Plan**” Presented at the 2014 Lake Erie Water Treatment Plant Meeting, Avon Lake, OH. March 24, 2015.

Mash, H., Dugan, N., **Lytle, D.A.**, Muhlen, C., Sanan, T., Kelty, K., and M. Pham. “**2013 Lake Erie Cyanobacterial Toxin Sampling Project**” Presented at 2014 Toxicology and Risk Assessment Conference, April 9, 2015.

Mash, H., Dugan, N., **Lytle, D.A.**, Muhlen, C., Sanan, T., Kelty, K., and M. Pham. “2013 Lake Erie Cyanobacterial Toxin Sampling Project” Presented at 2014 Toxicology and Risk

Assessment Conference, April 9, 2015.

Lytle, D.A.*, Triantafyllidou, and C. Muhlen. Maintaining Water Quality in Building Plumbing Systems. Ohio AWWA Safe Drinking Water Act Seminar. Columbus, Ohio Dec. 8, 2014.

Schock, M.R. and **D.A. Lytle. Demystifying Copper Corrosion.** 133rd NEWWA Annual Conference, Rockport, Maine Sept. 21-24, 2014.

Lytle, D.A., Williams, D., Muhlen, C., Pham, M., M. Wildman. **Advances in Biological Treatment: Pilot to Full-Scale.** 11th Annual U.S. EPA Small Systems Drinking Water Workshop: Small Systems Challenges and Solutions. Cincinnati, OH Sept. 9-11, 2014.

Dugan, N., Mash, H., **Lytle, D.A.**, Muhlen, C., Sanan, T., Kelty, K., and M. Pham. **Cyanobacterial Cells and Toxins: Evaluating Source Water Trends and Propagation through Lake Erie Treatment Facilities.** 11th Annual U.S. EPA Small Systems Drinking Water Workshop: Small Systems Challenges and Solutions. Cincinnati, OH Sept. 9-11, 2014.

Triantafyllidou, S., Lytle, D.A., Rodgers, M, Muhlen, C., Elk, M., Boczek, L., Hoelle, J., Pfaller, S., and J. Santo Domingo. **ORD Research on Building Water Quality.** 11th Annual U.S. EPA Small Systems Drinking Water Workshop: Small Systems Challenges and Solutions. Cincinnati, OH Sept. 9-11, 2014.

O'Donnell, A. and **D.A. Lytle. Effect of Conventional Drinking Water Treatment on Strontium Removal.** 2014 Ohio WEA/AWWA Joint Conference, Columbus, OH Aug. 26-29, 2014.

Dugan, N., Mash, H., **Lytle, D.A.**, Muhlen, C., Sanan, T., Kelty, K., and M. Pham. **Emerging Issues for Source Water: Cyanobacterial Cells and Toxins: Evaluating Source Water Trends and Propagation through Lake Erie Treatment Facilities.** 2014 Ohio WEA/AWWA Joint Conference, Columbus, OH Aug. 26-29, 2014.

Triantafyllidou, S., Lytle, D.A., Rodgers, M, Muhlen, C., Elk, M., Boczek, L., Hoelle, J., Pfaller, S., and J. Santo Domingo. **Challenges in Maintaining Drinking Water Quality at Hospitals and Other Large Buildings.** 2014 Ohio WEA/AWWA Joint Conference, Columbus, OH Aug. 26-29, 2014.

Daniels, Stephanie, **Lytle, D.A.**, and S. Harmon. **A Visual Insight into the Degradation of Metals in Drinking Water Distribution Systems Using AFM.** American Water Works Annual Conference. Boston, MA. June 11, 2014.

Wildman, M and **D.A. Lytle. Innovative Biological Ammonia Treatment for Small Systems: Pilot to Full-Scale.** American Water Works Annual Conference. Boston, MA. June 10, 2014.

O'Donnell, A.J. and **D.A. Lytle**. **Full-Scale and Bench-Scale Studies on the Removal of Strontium from Water**. American Water Works Annual Conference. Boston, MA. June 11, 2014.

Triantafyllidou, S., **Lytle, D. A.**, Rodgers, M., Pfaller, S., Santo-Domingo, J., and L. Boczek. **Water Quality Monitoring in a Hospital.** American Water Works Annual Conference. Boston, MA. June 9, 2014.

Lytle, D. A., Triantafyllidou, S., Botkins, J., and T. Sorg. **Release of Contaminants from Distribution System Materials to Drinking Water: Mechanisms and Case Studies.** American Water Works Annual Conference. Boston, MA. June 9, 2014.

***Lytle, D.A. , et al.** **"Small Water Systems and Disinfection Technologies."** Legionella Disease Prevention in the Healthcare Setting Strategy Workshop, Washington, D.C., Dec. 3-4, 2013.

Radabaugh, Z., Werth, T., Kohne, M., and **D.A. Lytle**. **Copper and Lead Corrosion in a Full-Scale Home Plumbing System Simulation.** Poster, 10th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. September 10-12, 2013.

Lytle, D.A., O'Donnell, A., and T. Sorg. **Emerging Inorganic Contaminants: Strontium, Vanadium, and Others. Presented at Poster,** 10th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. September 10-12, 2013.

Lytle, D.A. and C.White, **"Design & Operational Constraints on Biological Ammonia Treatment"**. Presentation at AWWA Annual Conference, Denver, CO., June 10-13, 2013.

Lytle, D.A. Schock, M.R., and J.Leo, **"The Impact of Orthophosphate on Copper Solubility"**. Presentation at AWWA Annual Conference, Denver, CO., June 10-13, 2013.

Lytle, D.A. , White, C., Popovicic, J., and E.W.Rice, **"Elucidating Microbial Cell Attachment/Detachment using Hydrophobicity and Electrokinetic Measurements in Aqueous Systems"**. Presentation at AWWA Annual Conference, Denver, CO., June 10-13, 2013.

Lytle, D.A. , Minning, T., Pham, M., and K. Kelty, **"Loss of Dissolved Lead in Drinking Water to Syringe Filters"**. Presentation at AWWA Annual Conference, Denver, CO., June 10-13, 2013.

***Lytle, D.A.,** Williams, D. and C. White, **"Biological treatment for arsenic, ammonia and iron removal"**. Invited presentation at Greene County Sanitary Engineering Training, Xenia, OH., April 16, 2013.

***Lytle, D.A., “Overview of Water Infrastructure Research in SSWR Program”.** Invited presentation at EPA RESEARCH FORUM: Advancing Public Health Protection through Water Infrastructure Sustainability, April 10-11, 2013.

Lytle, D.A., Williams, D. and C. White, “Engineering Design Configurations for Biological Ammonia Removal”. Presentation at AWWA Biological Treatment Symposium, Denver CO., March 28-29, 2013.

Lytle, D.A., White, C. P., Williams, D. and C. Muhlen, “Biological Oxidation of As(III) in a Full-Scale Iron Removal Plant”. Presentation at AWWA Biological Treatment Symposium, Denver CO., March 28-29, 2013.

***Lytle, D.A., “EPA’s Drinking Water Distribution System Research”.** Chinese Research Academy of Environmental Sciences (CRAES)- U.S. EPA Workshop on Water Environmental Protection and Management Workshop, Beijing, China, Feb. 4, 2013.

***Lytle, D.A., “EPA Iron Corrosion and Release Research Update”** Presented at 2013 joint Chinese Academy of Sciences (CAS)-RCEES- U.S. Environmental Protection Agency Workshop on Drinking Water Quality and Distribution Safety, Beijing, China, Feb. 2, 2013.

***Lytle, D.A. “Ammonia Removal from Small Drinking Water Systems”.** Presentation at 2012 9th Annual U.S. EPA ORD/OGWD and ASDW Small System Drinking Water Workshop. Cincinnati, OH. Sept. 11-13, 2012.

Liggett J. and Lytle D. “Arsenic Adsorption on a Cast Iron Pipe Section” Poster, 9th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. September 11-13, 2012.

Lytle, D.A. “Ammonia Removal from Small Drinking Water Systems” 9th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. September 11-13, 2012.

White, C. P., D. A. Lytle, D. Williams, and C. Muhlen. “Oxidation of Ammonia in Source Water Using Biological Filtration” (slides). In Proceedings, Water Quality Technology Conference and Exposition, Phoenix, AZ, November 13 - 17, 2011. American Water Works Association, Denver, CO, #1747, (2011).

Lytle, D.A., and J. Liggett. “Arsenic Accumulation and Release Studies Using a Cast Iron Pipe Section” Water Quality Technology Conference and Exposition. American Water Works Association, Denver, CO, Phoenix, AZ, November 13 - 17, 2011.

Liggett J. and Lytle D. “Impact of pH, Oxidant Demand, and Phosphate on Copper Release and Corrosion”. Poster 8th Annual U.S. EPA Drinking Water Workshop: Treatment and Distribution System Compliance Challenges. Cincinnati, OH. August 30-31, 2011.

DeHaan, M., McAfee, C., and **D.A. Lytle**. **"Evaluation of Park City, Utah's Arsenic, Thallium, Manganese and Mercury Water Quality Events in the Distribution System."** (poster) AWWA Water Quality Technology Conference. Phoenix, AZ, Nov. 13-16, 2011.

***Lytle, D.A. "EPA Distribution System (DS) Research as it Relates to the TCRDS and the DS Research Partnership....and More."** AWWA Water Quality Technology Conference. Savannah, GA. Nov. 14-17, 2010 (opening session).

***Lytle, D.A. "Understanding and Controlling Iron Release in Distribution Systems."** 7th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. August 10-12, 2010.

Liggett, J., Conover, J., and **D.A. Lytle**. **"Impact of pH and DIC on Lead Mineralogy and Solubility in Drinking Water."** Poster. 7th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. August 10-12, 2010.

Popovici, J., White, C., and **D.A. Lytle**. **"The Use of Bacterial Adherence to Hydrocarbons (BATH) Assay in Evaluation of the Hydrophobic Surface Characteristics of Potential Water Pathogens."** Poster. 7th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. August 10-12, 2010.

Schroeder, M.F. and **D.A. Lytle**. **"The Adsorption of Arsenic on Iron Pipes in Water Distribution Systems."** Poster. 7th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. August 10-12, 2010.

Speth, T.F. **"Developing Drinking Water Technology Initiatives."** Presented by **D.A. Lytle**. 7th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. August 10-12, 2010.

White, C., Popovici, J., and **D.A. Lytle**. **"Biological Oxidation of Ammonia and Arsenic in Pilot-Scale Rapid Sand Filters."** Poster. 7th Annual U.S. EPA Drinking Water Workshop. Cincinnati, OH. August 10-12, 2010.

***Lytle, D.A. "Dealing with Corrosion in Your Distribution System."** OKI Groundwater Committee Meeting , Cincinnati, OH, June 2, 2010.

Daniels, S. L.; **Lytle D.A.**; Garino, J.C. **"Effects of pH, Orthophosphates and Exposure Time on the Corrosion of Copper Surfaces Viewed by Atomic Force Microscopy"**, 37th Annual NOBCCHE Conference, Atlanta, GA (3/2010).POSTER

Daniels, S. L.; **Lytle, D. A.**; Garino, J. C. **"Effects of pH, Orthophosphates and Exposure Time on the Corrosion of Copper Surfaces Viewed by Atomic Force Microscopy."**, 61st Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Best Student Poster Award, Orlando, FL (2/2010).POSTER

Daniels, S. L.; **Lytle D.A.**; Garno, J.C. **“The effects of Orthophosphate in Drinking Water on the Initial Copper Corrosion using Atomic Force Microscopy”**, American Chemical Society 238th National Meeting, Division of Environmental Chemistry and Sci-Mix, Washington, DC (8/2009). POSTER

***Lytle, D.A.** **“U.S. EPA Lead and Copper Corrosion Research Program Update.”** NACE WaterCorr Web Series. Jan. 12, 2010.

***Lytle, D.A.** (T. Sorg filled-in to give presentation), **“Accumulation of Trace Contaminants in Drinking Water Distribution Systems.”** Michigan Section AWWA Annual Conference, Traverse City, MI. Sept. 15, 2009.

Daniels, S. L.; Lewandowski B.R.; **Lytle D.A.**; Garno, J.C. **“Investigation of the Effect of Water Quality on the Initial Development of Corroding Copper by Atomic Force Microscopy”**, American Water Works Association (AWWA) Water Quality Technology Conference, Seattle, WA (11/2009).

Daniels, S.L.; Lewandowski, B.R.; **Lytle, D.A.**; and J.C. Garno. **“Effect of pH and Orthophosphate Levels of Drinking Water During the Initial Stages of Copper Corrosion Investigated with Atomic Force Microscopy.”** 238th ACS National Meeting, Washington, D.C. Aug.16-20, 2009.

Lytle, D.A. **“The Application of Orthophosphate to Reduce Elevated Copper Levels in a New Building with High DIC Water.”** Poster. 2009 AWWA Annual Conference and Exposition. San Diego, CA. June 14-18, 2009.

Lytle, D.A.; Williams, D.; Muhlen, C.; Almassalkhi, B.; C. White. **“Consequences and Reduction of Elevated Ammonia in Illinois Groundwaters: U.S. EPA Research Efforts.”** ISAWWA/IWEA Meeting, March 16-19, 2009.

***Lytle, D.A.** **“The Relationship Between Redox Stability, Corrosion, and Metal Release.”** AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20, 2008.

***Lytle, D.A.** **“Additional U.S. EPA Accumulation and Release Studies.”** AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20, 2008.

Melton, L. and **D.A. Lytle.** **“Impact of Water Chemistry on Synthetically Precipitated Copper Particles.”** AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20, 2008.

Nadagouda, M.N.; **Lytle, D.A.**; and M.R. Schock. **“Comparison between Synthesized Lead Particles and Lead Solids Formed on the Surface in Real Drinking Water Distribution Systems.”** Poster. AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20,

2008.

O'Donnell, A. and **D.A. Lytle**. **"The Impact of Hexametaphosphate on Copper Corrosion and Release."** AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20, 2008.

Moor, J.; **Lytle, D.A.**; and T.J. Sorg. **"Oxidant Selection for the Treatment of Mn(II), Fe(II) and As(III) in Groundwaters."** Poster. AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20, 2008

Williams, D.; **D.A. Lytle**; and Colin White. **"A Simple Approach to Assessing Copper Pitting Corrosion Tendencies and Developing Control Strategies."** Poster. AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20, 2008.

Lytle, D.A. **"Practical Tools for Assessing Corrosion Control."** 5th Annual U.S. EPA Treatment and Distribution System Compliance Challenges Workshop. Cincinnati, OH. Aug. 5-7, 2008.

O'Donnell, A. and **D.A. Lytle**. **"Evaluating the Impact of Water Chemistry on Cuprosolvency and Copper Corrosion By-Products Using a Simple Copper Pipe Recirculating Loop."** Poster. 5th Annual U.S. EPA Treatment and Distribution System Compliance Challenges Workshop. Cincinnati, OH. Aug. 5-7, 2008.

Davis, D.; Jones, H.; and **D.A. Lytle**. **"Characterization of Localized Corrosion of Copper Pipes Used in Drinking Water."** Poster. 5th Annual U.S. EPA Treatment and Distribution System Compliance Challenges Workshop. Cincinnati, OH. Aug. 5-7, 2008.

Moor, J. and **D.A. Lytle**. **"A Comparison of Residential Copper Pipes Carrying Hot and Cold Water."** Poster. 5th Annual U.S. EPA Treatment and Distribution System Compliance Challenges Workshop. Cincinnati, OH. Aug. 5-7, 2008.

White, C. and **D.A. Lytle**. **"A Solids Analysis Approach Incorporating Argon Ion Milling to Copper and Lead Pipe Scale Analysis."** Poster. 5th Annual U.S. EPA Treatment and Distribution System Compliance Challenges Workshop. Cincinnati, OH. Aug. 5-7, 2008.

Lytle, D.A.; Worrell, A.; and J. Newton. **"The Impact of Chloride, Sulfate and Bicarbonate on Iron Release from an Old Iron Pipe."** AWWA Annual Conference and Exposition. Atlanta, GA. June 8-12, 2008.

Lytle, D.A. **"Arsenic and Ammonia Related Drinking Water Research in EPA Region V."** EPA R5/PWSS State Directors Meeting. Chicago, IL. April 21, 2008.

Kang, Y.; van Ooij, W.J.; and **D.A. Lytle**. **"Characterization of Corrosion Products by**

Combining Electrochemical and Surface Analyses.” NACE Corrosion Conference. New Orleans, LA. Mar. 26-20, 2008.

White, C. and **D.A. Lytle**. **“The Effect of Phosphate on the Morphological and Spectroscopic Properties of Copper Drinking Water Pipes Experiencing Localized Corrosion.”** AWWA Water Quality Technology Conference. Charlotte, NC. Nov. 4-8, 2007.

Lytle, D.A.; Muhlen, C.; and B. Almassalkhi. **“Elevated Natural Source Water Ammonia and Nitrification in the Distribution Systems of Four Water Utilities.”** AWWA Water Quality Technology Conference. Charlotte, NC. Nov. 4-8, 2007.

Lytle, D.A.; Chen, A.; Muhlen, C.; Sorg, T.; and K. French. **“Nitrification, and Iron and arsenic Removal in Biologically Active Filters: A Case Study.”** AWWA Water Quality Technology Conference. Charlotte, NC. Nov. 4-8, 2007.

Morris, E. and **D.A. Lytle**. **“The Accumulation of Radium and Other Radionuclides in Drinking Water Distribution Systems.”** AWWA Water Quality Technology Conference. Charlotte, NC. Nov. 4-8, 2007.

Kang, Y.; van Ooij, W.J.; and **D.A. Lytle**. **“The Application of Electrochemical and Surface Analysis Approaches to Studying Copper Corrosion in Water: Fundamentals, Limitations and Examples.”** AWWA Water Quality Technology Conference. Charlotte, NC. Nov. 4-8, 2007.

Kang, Y.; van Ooij, W.J.; and **D.A. Lytle**. **“Study of Copper Corrosion in Drinking Water Using Electrochemical and Surface Analyses.”** 212th Annual Electrochemical Society Meeting. Washington, D.C. Oct. 7-12, 2007.

Lytle, D.A. **“Copper Research Update.”** 2007 U.S. EPA ORD/OGWDW Workshop on Inorganic Contaminant Issues. Cincinnati, OH. Aug. 21-23, 2007.

Lytle, D.A. **“Accumulation of Contaminants in Distribution Systems.”** 2007 U.S. EPA ORD/OGWDW Workshop on Inorganic Contaminant Issues. Cincinnati, OH. Aug. 21-23, 2007.

Moor, J. and **D.A. Lytle**. **“Biological Filtration for the Nitrification of Excessive Levels of Free Ammonia.”** AWWA Annual Conference and Exposition. Toronto, ON. June 25-28, 2007.

Lytle, D.A., and M.R. Schock. **“Unsolved Problems with Corrosion and Distribution System Inorganics.”** AWWA Annual Conference and Exposition. Toronto, ON. June 25-28, 2007.

Green, C.; **Lytle, D.A.**; Ho, C.; and M.J. Kiristis. **“Microbial Oxidation of Arsenic: The Potential for Exploitation in Drinking Water Treatment.”** AWWA Annual Conference and Exposition. Toronto, ON. June 25-28, 2007.

Turek, N.F.; Kasten, L.; **Lytle, D.A.**; and M.N. Goltz. 2006. **"Investigation of Copper Contamination and Corrosion Scale Mineralogy in Aging Drinking Water Distribution Systems."** AWWA Annual Conference and Exposition. San Antonio, TX. June 11-15, 2006.

Sorg, T.J. and **D.A. Lytle**. **"Arsenic and Ohio Utilities."** Ohio AWWA Annual Conference. Columbus, OH. Nov. 9, 2006.

Lytle, D.A. **"Nitrification and Arsenic Removal in Biologically Active Filters: A Case Study."** University of Cincinnati, Environmental Engineering and Science Graduate Course Seminar. CEE 676. Cincinnati, OH. Nov. 17, 2006.

Lytle, D.A.; Schock, M.R.; and J. Kempic. **"U.S. EPA Lead and Copper Corrosion, Distribution System Research, and LCR Regulatory Update."** AWWA Water Quality Technology Conference. Denver, CO. Nov. 5-8, 2006.

Lytle, D.A. **"Copper Corrosion Update."** Ohio AWWA SDWA Seminar. Columbus, OH. Nov. 9, 2006.

***Lytle, D.A.** **"Nitrification and Arsenic Removal in Biologically Active Filters: A Case Study."** ASCE Dayton Section Meeting. Dayton, OH. May 18, 2006.

***Lytle, D.A.** (M. Schock filled-in to give presentation) **"Formation of Pb(IV) Oxides in Chlorinated Water."** AWWA Water Quality Technology Conference. Quebec, Canada, Nov. 5-9, 2005.

***Lytle, D.A.** **"The Accumulation and Release of Arsenic from Distribution System Solids."** AWWA CA/NV Section - Fall 2005 Conference. Reno, NV. Oct. 10-15, 2005.

***Lytle, D.A.** **"Iron Removal Processes: Full Scale Experience."** U.S. EPA/NRMRL/WSWRD Workshop on Arsenic Removal from Drinking Water. Cincinnati, OH. Aug. 16-18, 2005.

***Lytle, D.A.** **"Iron Removal Processes: System Modifications for Enhanced Arsenic Removal."** U.S. EPA/NRMRL/WSWRD Workshop on Arsenic Removal from Drinking Water. Cincinnati, OH. Aug. 16-18, 2005.

***Lytle, D.A.** **"Iron Removal Processes: Design of New Systems."** U.S. EPA/NRMRL/WSWRD Workshop on Arsenic Removal from Drinking Water. Cincinnati, OH. Aug. 16-18, 2005.

***Lytle, D.A.** **"Distribution System Issues."** U.S. EPA/NRMRL/WSWRD Workshop on Arsenic Removal from Drinking Water. Cincinnati, OH. Aug. 16-18, 2005.

***Lytle, D.A. "U.S. EPA's Arsenic Treatment Research Demonstration Program."** U.S. EPA Environmental Technologies Verification International Forum. Washington, D.C. July 12, 2005.

***Lytle, D.A. "Copper Pitting Corrosion and Pinhole Leaks: A Case Study."** AWWA Annual Conference and Exposition. San Francisco, CA. June 12-16, 2005.

***Lytle, D.A. "Arsenic Removal Using Adsorption Technologies."** AWWA Annual Conference and Exposition. San Francisco, CA. June 13-16, 2005.

***Lytle, D.A. "Adsorption Technologies."** U.S. EPA OGWDW Arsenic Workshop. Austin, TX. May 23-24, 2005.

***Lytle, D.A. "Reducing Arsenic Levels in Drinking Water During Iron Removal Processes."** U.S. EPA OGWDW Arsenic Workshop. Austin, TX. May 23-24, 2005.

***Lytle, D.A. "Reducing Arsenic Levels in Drinking Water During Iron Removal Processes."** U.S. EPA OGWDW Arsenic Workshop. South Bend, IN. May 12-13, 2005.

***Lytle, D.A. "Reducing Arsenic Levels in Drinking Water During Iron Removal Processes."** U.S. EPA OGWDW Arsenic Workshop. Sacramento, CA. April 28-29, 2005.

***Lytle, D.A. "Reducing Arsenic Levels in Drinking Water During Iron Removal Processes."** U.S. EPA OGWDW Arsenic Workshop. Phoenix, AZ. April 25-26, 2005.

***Lytle, D.A. "Reducing Arsenic Levels in Drinking Water During Iron Removal Processes."** Ohio AWWA Manufacturers Exposition. Wilmington, OH. April 19, 2005.

***Lytle, D.A. (T. Sorg filled-in to give presentation) "The Accumulation of Arsenic in Drinking Water Distribution Systems."** WQA Annual Conference. Las Vegas, NV. Mar. 29-Apr. 2, 2005.

Lytle, D.A. "Geochemistry of Sulfur in Iron Corrosion Scales Found in Drinking Water Distribution Systems." AWWA Water Quality Technology Conference. San Antonio, TX. Nov. 11-14, 2004.

***Lytle, D.A. "Arsenic Removal During Iron Removal."** Webcast Presentation. U.S. EPA Arsenic Rule Webcast. Oct. 20, 2004.

***Lytle, D.A. "Lead and Copper Research Update: Recent Findings and Future Areas of Research."** Ohio AWWA Annual Meeting. Toledo, OH. Sept. 15-17, 2004.

***Lytle, D.A. "Non-uniform Copper Corrosion: Research Update."** AWWARF Project 2927 Expert Meeting: Installation, Condition Assessment and Reliability of Service Lines,

Connections and Fittings. Aug. 24, 2004, Cincinnati, OH.

Lytle, D.A. "Iron Removal for Arsenic Removal." U.S. EPA Workshop on the Design and Operation of Adsorptive Media Processes for the Removal of Arsenic from Drinking Water. Cincinnati, OH. Aug. 10-11, 2004.

***Lytle, D.A. "Studying Distribution System Solids: Approach and Application."** AWWA Annual Conference and Exposition. Orlando, FL. June 13-17, 2004.

***Lytle, D.A. "Arsenic Treatment: Considerations and Case Studies."** Michigan DEQ: Emerging Issues in Water Treatment Meeting. Lansing, MI. May 18, 2004.

Lytle, D.A. and T.J. Sorg. "Optimizing Arsenic Removal During Iron Removal Processes." Inorganic Contaminants Workshop. Reno, NV. Feb. 1-3, 2004.

Copeland, R.C. Dionysiou, D.D. and **D.A. Lytle. "Arsenic Desorption from Distribution System Solids."** Poster Presentation at the 2004 Graduate Student Research/ Scholarship Forum of the University of Cincinnati, Cincinnati, OH., 2004.

Copeland, R.C. **Lytle, D.A.** and D.D. Dionysiou. **"Arsenic Desorption from Distribution System Solids."** Poster Presentation. Student Poster Competition. The 2004 Annual Conference of Ohio American Water Works Association (OAWWA), Toledo, OH, 2004.

Copeland, R.C. **Lytle, D.A.** and D.D. Dionysiou. **"Arsenic Desorption from Drinking Water Distribution System Solids."** Oral Presentation at The 1st International Conference on Environmental Science and Technology, New Orleans, LA., 2005.

Copeland, R.C. **Lytle, D.A.** and D.D. Dionysiou. **"Arsenic Desorption from Drinking Water Distribution Systems and Iron-Based Column Media."** Oral Presentation at the 67th AWWA Ohio Section Annual Conference, Columbus, OH., 2005.

***Lytle, D.A. "Drinking Water Quality Deterioration in Distribution Systems: Colored Water Formation and Its Control."** AWWA Distribution Systems Symposium. Portland, OR. September 28-30, 2003.

***Lytle, D.A. "Arsenic in OH: Considerations and Case Studies."** Ohio AWWA Annual Meeting. Cincinnati, OH. Sept. 21-26, 2003.

***Lytle, D.A. "Application of Models to Drinking Water Distribution System Processes and Their Limitations."** AWWARF Workshop on Distribution System Modeling Research Needs. Voorhees, NJ. Apr. 2-3, 2003.

***Lytle, D.A. "The Effect of Water Chemistry on the Properties of Iron Particles and**

Suspensions.” University of Illinois Student Symposium. Champaign, IL. Dec. 11, 2002.

***Lytle, D.A. “The Presence of Arsenic in Drinking Water Distribution Solids.”** Ohio EPA Arsenic Training Seminar. Columbus, OH. Oct. 16, 2002.

***Lytle, D.A. and V.L. Snoeyink. “Drinking Water Quality Deterioration in the Distribution System: Colored Water Formation and Its Control.”** Florida AWWA Region IV Symposium. Palm Harbor, FL. Sept. 20, 2001.

***Lytle, D.A. and M.R. Schock. “The LCR: What Have We Learned in the Last 10 Years.”** Florida AWWA Region IV Symposium. Palm Harbor, FL. Sept. 20, 2001.

***Lytle, D.A. and M.R. Schock. “Silicates for Corrosion Control.”** NACE Corrosion Conference/2001 Technical Information Exchange ISCX - *Supplemental Treatment of Potable Water in Building Systems*. Houston, TX. March 13, 2001.

Lytle, D.A. “The Effect of Water Chemistry on the Properties of Iron Particles and Iron Suspensions.” AWWA Water Quality Technology Conference. Salt Lake City, UT. Nov. 6-9, 2000.

Lytle, D.A. “The Effect of Fluoride on Conventional Drinking Water Treatment Using Aluminum Sulfate.” Ohio AWWA Annual Conference. Dayton, OH. Sept. 21-22, 2000.

Lytle, D.A. “The Effect of Water Chemistry on the Physical Properties of Iron Colloids and Aqueous Iron Suspensions.” AWWA Distribution Systems Symposium. Denver, CO. June 9-10, 2000.

Lytle, D.A. “The Effect of pH and Bicarbonate Concentration on the Oxygenation of Ferrous Iron in Aqueous Solutions.” AWWA Annual Conference and Exposition. Denver, CO. June 11-15, 2000.

Lytle, D.A. “A Systematic Study on the Surface Charge of Microorganisms in Drinking Water.” AWWA Water Quality Technology Conference. Tampa, FL. Nov. 1-4, 1999.

Lytle, D.A. “The Design of a Mini-scale Conventional/filtration Water Treatment Plant for *Cryptosporidium* Research.” AWWA Annual Conference and Exposition. Dallas, TX. June 21-25, 1998.

Lytle, D.A. “The Use and Reporting of Particle Surface Characteristics Measurements in Drinking Water.” AWWA Water Quality Technology Conference. Denver, CO. Nov. 9-12, 1997.

Lytle, D.A. “The Use of Aerobic Spore-Forming Bacteria for the Evaluation of Water

Treatment Performance. AWWA Annual Conference and Exposition. Toronto, ON. June 23-27, 1996.

Lytle, D.A. "An Evaluation of the Secondary Effects of Enhanced Coagulation, With Emphasis on Corrosion Control." U.S. EPA/NEWWA National Conference on Integrating Corrosion Control and Other Water Quality Goals. Cambridge, MA. May 19-21, 1996.

Lytle, D.A. "Evaluation of Corrosion Issues for Nanofiltration Treated Water." AWWA/U.S. EPA GAC and Membrane Workshop. Cincinnati, OH. March 3-5, 1996.

Lytle, D.A. "A Microbiological Surrogate for Evaluating Treatment Efficiency." Indiana AWWA Section Conference. Indianapolis, IN. Feb. 19-21, 1996.

Lytle, D.A. "A Microbiological Surrogate for Evaluating Treatment Efficiency." Ohio AWWA Section Conference. Springfield, OH. Sept. 25, 1995.

Lytle, D.A. "Investigation on Techniques and Control of Building Lead and Copper Corrosion by Orthophosphate and Silicate." NACE Corrosion Conference. Orlando, FL. Mar. 26-31, 1995.

Lytle, D.A. "The Effect of Composition, pH, and Orthophosphate on the Corrosion of Brass." Ohio AWWA Annual Conference. Toledo, OH. Sept. 21-23, 1994.

Lytle, D.A. "Experiences with Sodium Silicate in Corrosion Control Studies." PQ Corp. International Silicate Conference. Valley Forge, PA. July 19-21, 1994.

Lytle, D.A. "Silicates for Simultaneous Fe/Mn Stabilization and Corrosion Control." PQ Corp. International Silicate Conference. Valley Forge, PA. July 19-21, 1994.

Lytle, D.A. "A Systematic Study on the Control of Lead in a New Building." ASCE National Conference on Environmental Engineering. Boulder, CO. July 11-13, 1994.

Lytle, D.A. "A Systematic Study on the Control of Lead in a New Building." AWWA Annual Conference and Exposition. New York, NY. June 19-23, 1994.

Lytle, D.A. "Controlling Copper, Lead and Iron in Small Systems." 20th Annual U.S. EPA RREL Research Symposium. Cincinnati, OH. Mar. 15-17, 1994.

Lytle, D.A. "Sampling and Design Considerations for Corrosion Control Studies." NEWWA/U.S. EPA Solutions to Controlling Lead and Copper Corrosion II. Nashua, NH. Nov. 2-3, 1993.

Lytle, D.A. "Impact of pH and Lead Composition on Metal Leaching from Brass"

Coupons.” AWWA Annual Conference and Exposition. San Antonio, TX. June 6-10, 1993.

Lytle, D.A. “Metal Corrosion Coupon Study Contamination, Design, and Interpretation Problems.” AWWA Water Quality Technology Conference. Toronto, ON. Nov. 15-19, 1992.

Lytle, D.A. “Application of a Modified Aluminon Method in a Drinking Water Beryllium Removal Study.” AWWA Water Quality Technology Conference. Orlando, FL. Nov. 10-14, 1991.

Lytle, D.A. “Characterization of Wastes (Brines) from a Uranium Removal Plant.” AWWA/Water Pollution Control Joint Residuals Management Conference. Research Triangle Park, NC. Aug. 11-14, 1991.

PROCEEDINGS PUBLICATIONS

Dugan, N., Mash, H., Keltly, K. and D.A. Lytle, **“Removal of Pesticides and Inorganic Contaminants in Anaerobic and Aerobic Biological Contactors”**. Presentation at AWWA Biological Treatment Symposium, Denver CO., March 28-29, 2013.

Lytle, D.A., Williams, D. and C. White, “Engineering Design Configurations for Biological Ammonia Removal”. Presentation at AWWA Biological Treatment Symposium, Denver CO., March 28-29, 2013.

Lytle, D.A., White, C. P., Williams, D. and C. Muhlen, “Biological Oxidation of As(III) in a Full-Scale Iron Removal Plant”. Presentation at AWWA Biological Treatment Symposium, Denver CO., March 28-29, 2013.

White, C. P., D. A. Lytle, D. Williams, and C. Muhlen. **“Oxidation of Ammonia in Source Water Using Biological Filtration”** (slides). In Proceedings, Water Quality Technology Conference and Exposition, Phoenix, AZ, November 13 - 17, 2011. American Water Works Association, Denver, CO, #1747, (2011).

Yeuell, H.D.; Dvorak, B.; Gurian, P.; and D.A. Lytle. **“Improving Information Dissemination to Consulting Engineers Serving Small Systems: Suggestions Based on National Survey.”** AWWA Annual Conference and Exposition. Chicago, IL. June 20-24, 2010.

Williams, D. and D.A. Lytle. **“A Simple Approach to Assessing Copper Pitting Corrosion Tendencies and Developing Control Strategies.”** AWWA Water Quality Technology Conference. Cincinnati, OH. Nov. 16-20, 2008.

Turek, N.F.; Kasten, L.; **Lytle, D.A.**; and M.N. Goltz, 2006. **"Investigation of Copper Contamination and Corrosion Scale Mineralogy in Aging Drinking Water Distribution Systems."** AWWA Annual Conference and Exposition. San Antonio, TX. June 11-15, 2006.

Lytle, D.A.; Gerke, T.L.; and J.B. Maynard. **"Geochemistry of Sulfur in Iron Corrosion Scales Found in Drinking Water Distribution Systems."** AWWA Water Quality Technology Conference. San Antonio, TX. Nov. 11-14, 2004.

James, C.N.; Copeland, R.C.; and **D.A. Lytle**. **"Relationships between Oxidation-Reduction Potential, Oxidant, and pH in Drinking Water."** AWWA Water Quality Technology Conference. San Antonio, TX. Nov. 11-14, 2004.

Sarin, P.; Snoeyink, V.L.; and **D.A. Lytle**. **"Controlling Red Water and Iron Release."** Abstract. 1st IWA Leading-Edge Conference on Water and Wastewater Technologies. Czech Republic, Prague. May 31-June 3, 2004.

Gutierrez, S.C.; Haught, R.C.; **Lytle, D.A.**; and E.W. Rice. **"Advances in Drinking Water Treatment in the United States."** NATO Advanced Research Workshop. Dnepropetrovsk, Ukraine. Nov. 19-22, 2003.

Lytle, D.A.; Snoeyink, V.L.; and P. Sarin. **"The Effect of Chloride and Orthophosphate on the Release of Iron from a Drinking Water Distribution System Cast Iron Pipe."** AWWA Water Quality Technology Conference. Philadelphia, PA. Nov. 2-6, 2003.

Frietch, C.M. and **D.A. Lytle**. **"The Effect of pH, Phosphate and Oxidant Type on the Removal of Arsenic from Drinking Water During Iron Removal."** AWWA Water Quality Technology Conference. Philadelphia, PA. Nov. 2-6, 2003.

Snoeyink, V.L.; Sarin, P.; and **D.A. Lytle**. **"Iron Release and Colored Water Formation from Iron Scales."** AWWA Annual Conference and Exposition. Anaheim, CA. June 15-19, 2003.

Lytle, D.A. and V.L. Snoeyink. **"The Influence of Oxidant Type on the Properties of Iron Colloids and Suspensions Formed from Ferrous Iron."** AWWA Water Quality Technology Conference. Seattle, WA. Nov. 10-13, 2002.

Lytle, D.A.; Sorg, T.J.; and C. Frietch. **"The Significance of Arsenic-Bound Solids in Drinking Water Distribution Systems."** AWWA Water Quality Technology Conference. Seattle, WA. Nov. 10-13, 2002.

Stonesifer, K.; **Lytle, D.A.**; and M.R. Schock. **"Oxidant and Redox Potential Effects on the Corrosion of Distribution System Materials."** AWWA Water Quality Technology Conference. Seattle, WA. Nov. 10-13, 2002.

Lytle, D.A. and V.L. Snoeyink. "The Effect of Ortho- and Poly-Phosphates on the Properties of Iron Particles and Suspensions Formed from the Oxygenation of Ferrous Iron." AWWA Annual Conference and Exposition. New Orleans, LA. June 16-20, 2002.

Lytle, D.A. and V.L. Snoeyink. "The Effect of Water Chemistry on the Properties of Iron Particles and Iron Suspensions." AWWA Water Quality Technology Conference. Salt Lake City, UT. Nov. 6-9, 2000.

Feld, C.M.; Lytle, D.A.; and M.R. Schock. "The Effect of Fluoride on Conventional Drinking Water Treatment Using Aluminum Sulfate." AWWA Water Quality Technology Conference. Salt Lake City, UT. Nov. 6-9, 2000.

Lytle, D.A. and V.L. Snoeyink. "The Effect of Water Chemistry on the Physical Properties of Iron Colloids and Aqueous Iron Suspensions." AWWA Distribution Systems Symposium. Denver, CO. June 9-10, 2000.

Lytle, D.A.; Snoeyink, V.L.; and M.R. Schock. "The Effect of pH and Bicarbonate Concentration on the Oxygenation of Ferrous Iron in Aqueous Solutions." AWWA Annual Conference and Exposition. Denver, CO. June 11-15, 2000.

Sarin, P.; Bebee, J.; Beckett, M.A.; Jim, K.K.; Lytle, D.A.; Clement, J.A.; Kriven, W.M.; and V.L. Snoeyink. "Mechanism of Release of Iron from Corroded Iron/Steel Pipes in Water Distribution Systems." AWWA Annual Conference and Exposition. Denver, CO. June 11-15, 2000.

Lytle, D.A.; Snoeyink, V.L.; and M.R. Schock. "The Effect of pH and Bicarbonate Concentration on the Oxygenation of Ferrous Iron in Aqueous Solutions." AWWA Annual Conference and Exposition. Denver, CO. June 11-15, 2000.

Sarin, P.; Bebee, J.; Beckett, M.A.; Jim, K.K.; Lytle, D.A.; Clement, J.A.; Kriven, W.M.; and V.L. Snoeyink. "Mechanism of Release of Iron from Corroded Iron/Steel Pipes in Water Distribution Systems." AWWA Annual Conference and Exposition. Denver, CO. June 11-15, 2000.

Lytle, D.A.; Rice, E.W.; Johnson, C.H.; Owens, J.H.; and M.M. Marshall. "A Systematic Study on the Surface Charge of Microorganisms in Drinking Water." AWWA Water Quality Technology Conference. Tampa, FL. Nov. 1-4, 1999.

Lytle, D.A. and M.R. Schock. "The Significance of "Stagnation Curves" for Lead and Copper, and Water Quality Factors Affecting Them." 118th NEWWA Annual Conference. Burlington, VT. Sept. 19-22, 1999.

Lytle, D.A. "Corrosion Control in Distribution Systems." U.S. EPA 6th National Drinking

Water and Wastewater Treatment Technology Transfer Workshop. Kansas City, MO. Aug. 2-4, 1999.

Dugan, N.R.; Fox, K.R.; Miltner, R.J.; and **D.A. Lytle**. "**Control of *Cryptosporidium* Oocysts by Steady State Conventional Treatment.**" AWWA Annual Conference and Exposition. Chicago, IL. June 20-24, 1999.

Sarin, P.; Jim, K.; **Lytle, D.A.**; Beckett, M.A.; Kriven, W.M.; Snoeyink, V.L.; and J.A. Clement. "**Systematic Study of Corrosion Scales and Their Release of Iron Particles in Drinking Water.**" AWWA/U.S. EPA Particle Measurement and Characterization in Drinking Water Treatment Symposium. Nashville, TN. March 28-30, 1999.

Beckett, M.; Snoeyink, V.L.; Jim, K.; Sarin, P.; **Lytle, D.A.**; Kriven, W., and J. Clement. "**A Pipe Loop System for Evaluating Iron Uptake in Distribution Systems.**" AWWA Water Quality Technology Conference. San Diego, CA. Nov. 1-5, 1998.

Fox, K.R.; Dugan, N.R.; Miltner, R.J.; **Lytle, D.A.**; Williams, D.J.; Parrett, C.J.; Feld, C.M.; Owens, J.H.; Rice, E.W.; and C.H. Johnson. "**Comparative Removal of *Cryptosporidium parvum* and Surrogates in a Low-Flow Pilot Plant System.**" AWWA Water Quality Technology Conference. San Diego, CA. Nov. 1-5, 1998.

Schock, M.R.; Clement, J.; **Lytle, D.A.**; Sandvig, A.M.; and S.M. Harmon. "**Replacing Polyphosphate with Silicate to Solve Problems with Lead, Copper, and Source Water Iron.**" AWWA Water Quality Technology Conference. San Diego, CA. Nov. 1-5, 1998.

Lytle, D.A.; Fox, K.R.; Miltner, R.J.; Speth, T.F.; Schock, M.R.; Kropp, K.L.; Shukairy, H.; Fichter, L.; and N. Dugan. "**The Design of a "Mini-scale" Conventional/Filtration Water Treatment Plant for *Cryptosporidium* Research.**" AWWA Annual Conference and Exposition. Dallas, TX. June 21-25, 1998.

Schock, M.R.; Hidmi, L.; Edwards, M.A.; and **D.A. Lytle**. "**The Importance of Metastable Solids in Copper Release.**" Inorganic Contaminants Workshop. San Antonio, TX. Feb. 23-24, 1998.

Lytle, D.A.; Rice, E.W.; Fox, K.R.; Johnson, C.H.; Owens, J.; and J.O. Gerkin. "**The Use and Reporting of Particle Surface Characteristics Measurements in Drinking Water.**" AWWA Water Quality Technology Conference. Denver, CO. Nov. 9-12, 1997.

Larosa-Thompson, J.L.; Scheetz, B.E.; Schock, M.R.; **Lytle, D.A.**; and P.J. Delaney. "**Sodium Silicate Corrosion Inhibitors: Issues of Effectiveness and Mechanism.**" AWWA Water Quality Technology Conference. Denver, CO. Nov. 9-12, 1997.

Lytle, D.A. and M.R. Schock. "**The Impact of Stagnation Time on the Dissolution of Metal**

from Plumbing Materials.” AWWA Annual Conference. Atlanta, GA. June 12-19, 1997.

Lytle, D.A.; Fox, K.R.; Rice, E.W.; Owens, J.; and C.H. Johnson. “The Use of Aerobic Spore-Forming Bacteria for the Evaluation of Water Treatment Performance.” AWWA Annual Conference. Toronto, ON. June 23-27, 1996.

Fox, K.R. and D.A. Lytle. “Zeta Potential and Particle Counting for Optimizing Pathogen Removal.” AWWA Annual Conference and Exposition. Toronto, ON. June 23-27, 1996.

Lytle, D.A.; Schock, M.R.; and R.J. Miltner. “An Evaluation of the Secondary Effects of Enhanced Coagulation, with Emphasis on Corrosion Control.” U.S. EPA/NEWWA National Conference on Integrating Corrosion Control and Other Water Quality Goals. Cambridge, MA. May 19-21, 1996.

Lytle, D.A.; Schock, M.R.; Speth, T.; and J. Swertfegger. “Evaluation of Corrosion Issues for Nanofiltration Treated Water.” U.S. EPA/AWWA GAC and Membrane Workshop. Cincinnati, OH. Mar. 3-5, 1996.

Lytle, D.A. “How Do I Run a Proper Jar Test?” AWWA Water Quality Technology Conference. New Orleans, LA. Nov. 12-16, 1995.

Lytle, D.A.; Schock, M.R.; and J.A. Clement. “Application and Considerations of Aeration for Corrosion Control.” AWWA Water Quality Technology Conference. New Orleans, LA. Nov. 12-16, 1995.

Miller, N.T.; Delaney, P.; Schock, M.R.; and D.A. Lytle. “Analytical Issues in Corrosion and Deposition Studies.” AWWA Water Quality Technology Conference. New Orleans, LA. Nov. 12-16, 1995.

Sorg, T.J.; Schock, M.R.; and D.A. Lytle. “An Evaluation of Ion Exchange Softening on the Leaching of Metals from Household Plumbing Materials.” AWWA Annual Conference and Exposition. Anaheim, CA. June 18-22, 1995.

Schock, M.R. and D.A. Lytle. “Control of Copper Corrosion of Household Plumbing Materials.” 21st Annual U.S. EPA RREL Research Symposium. Cincinnati, OH. April 4-6, 1995.

Schock, M.R.; Lytle, D.A.; and J.A. Clement. “Effects of pH, Carbonate, Orthophosphate, and Redox Potential on Cuprosolvency.” NACE Corrosion Conference. Orlando, FL. March 26-31, 1995.

Lytle, D.A.; Schock, M.R.; and T.J. Sorg. “Investigation on Techniques and Control of Building Lead and Copper Corrosion by Orthophosphate and Silicate.” NACE Corrosion

Conference. Orlando, FL. March 26-31, 1995.

Rice, E.W.; Fox, K.R.; Miltner, R.J.; **Lytle, D.A.**; and C.H. Johnson. **"A Microbiological Surrogate for Evaluating Treatment Efficiency."** AWWA Water Quality Technology Conference. San Francisco, CA. Nov. 7-10, 1994.

Schock, M.R. and **D.A. Lytle**. **"The Importance of Stringent Control of DIC and pH in Laboratory Corrosion Studies."** AWWA Water Quality Technology Conference. San Francisco, CA. Nov. 7-10, 1994.

Lytle, D.A. and K.R. Fox. **"Particle Counting and Zeta Potential Measurements for Optimizing Filtration Treatment Performance."** AWWA Water Quality Technology Conference. San Francisco, CA. Nov. 7-10, 1994.

Lytle, D.A.; Miltner, R.J.; Dryfuse, M.J.; Schock, M.R.; and R.S. Summers. **"An Evaluation of the Secondary Effects of Enhanced Coagulation."** AWWA Enhanced Coagulation Research Specialty Workshop. Charleston, SC. Dec. 4-6, 1994.

Fox, K.R. and **Lytle, D.A.** **"Cryptosporidium and the Milwaukee Incident."** ASCE National Conference on Environmental Engineering. Boulder, CO. July, 1994.

Schock, M.R.; **Lytle, D.A.**; and J.A. Clement. **"Modeling Issues of Copper Solubility in Drinking Water."** ASCE National Conference on Environmental Engineering. Boulder, CO. July, 1994.

Clement, J.A.; Schock, M.R.; and **D.A. Lytle**. “**Controlling Lead and Copper Corrosion and Sequestering of Iron and Manganese.**” ASCE National Conference on Environmental Engineering. Boulder, CO. July, 1994.

Fox, K.R. and **D.A. Lytle**. “**Cryptosporidium: The Milwaukee Experience and Relevant Research.**” AWWA Annual Conference and Exposition. New York, NY. June 19-23, 1994.

Lytle, D.A.; Schock, M.R.; and T.J. Sorg. “**A Systematic Study on the Control of Lead in a New Building.**” AWWA Annual Conference and Exposition. New York, NY. June 19-23, 1994.

Lytle, D.A. and J.A. Clement. “**Controlling Copper, Lead and Iron in Small Systems.**” 20th Annual U.S. EPA RREL Research Symposium. Cincinnati, OH. March 15-17, 1994.

Fox, K.R. and **D.A. Lytle**. “**The Milwaukee Cryptosporidiosis Outbreak: Investigation and Recommendations.**” AWWA Water Quality Technology Conference. Miami, FL. Nov. 7-11, 1993.

Lytle, D.A. and M.R. Schock. “**Impact of pH and Lead Composition on Metal Leaching from Brass Coupons.**” AWWA Annual Conference and Exposition. San Antonio, TX. June 6-10, 1993.

Clement, J. and **D.A. Lytle**. “**Considerations for the Use of Polyphosphates and Silicates to Control Lead and Copper Based Corrosion.**” AWWA Annual Conference and Exposition. San Antonio, TX. June 6-10, 1993.

Sorg, T.J.; **Lytle, D.A.**; and M.R. Schock. “**Evaluation of Corrosion Inhibitors to Reduce Lead in the Drinking Water in Buildings.**” 19th Annual U.S. EPA RREL Research Symposium. Washington, D.C. April, 1993.

Lytle, D.A.; Schock, M.R.; and S. Tackett. “**Metal Corrosion Coupon Study Contamination, Design, and Interpretation Problems.**” AWWA Water Quality Technology Conference. Toronto, ON. Nov. 15-19, 1992.

Schock, M.R. and **D.A. Lytle**. “**Corrosion Control Principles and Strategies for Reducing Lead and Copper in Drinking Water Systems.**” WQA Annual Convention. Orlando, FL. March 11-15, 1992.

Lytle, D.A.; George, G.K.; and J.U. Doerger. “**Application of a Modified Aluminon Method in a Drinking Water Beryllium Removal Study.**” AWWA Water Quality Technology Conference. Orlando, FL. Nov. 10-14, 1991.

Sorg, T.J.; Schock, M.R.; and **D.A. Lytle**. “**Evaluating Chemical Treatment to Reduce Lead in a Building: A Case Study.**” AWWA/U.S. EPA National Workshop on Control of Lead and

Copper in Drinking Water. Chicago, IL. Sept. 23-25, 1991.

Sorg, T.J.; **Lytle, D.A.**; Egan, J.; and Z. Zhang. **“Characterization of Wastes (Brines) from a Uranium Removal Plant.”** AWWA/Water Pollution Control Joint Residuals Management Conference. Research Triangle Park, NC. Aug. 11-1

Rennaker, Joanne (DEQ)

From: Rosenthal, Adam (DEQ)
Sent: Monday, May 19, 2014 11:14 AM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: FW: DBP locations

Flint DBP

From: Michael Glasgow [<mailto:mglasgow@cityofflint.com>]
Sent: Monday, May 19, 2014 10:00 AM
To: Rosenthal, Adam (DEQ)
Subject: Re: DBP locations

Adam,

We did find an additional 4 sites for TTHM & HAA5 monitoring. I went back and looked at the data used to determine our sites for Stage 2 DBP implementation. We will be using the available sites that had the highest levels of TTHM & HAA5.

Mike Glasgow
 City of Flint Water Plant

On Mon, May 19, 2014 at 8:46 AM, Rosenthal, Adam (DEQ) <ROSENTHALA@michigan.gov> wrote:

Morning Mike, we wanted to make sure you found an additional 4 sites (8 total) for TTHM & HAA5 monitoring that is due by the end of May. Let me know.

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

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, November 12, 2013 8:02 AM
To: Busch, Stephen (DEQ)
Subject: FW: DEQ Meeting with Flint City

Steve,

Steve,

I have not spoken with Dave directly regarding his questions; however, John 'O and I talked last Friday (late morning) regarding these questions. I did not go into detail with John on Flint asking us to reconsider Bray Road....but kept it more general that Flint is investigating several cost options for disposal of lime sludge. I also indicated that we would not push source water assessment of the Flint River watershed on the basis that this is expected to serve as a temporary source (18-24 months).... then as an emergency back-up source after KWA.

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

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

From: John O'Malia [<mailto:jcomalia@gmail.com>]
 Sent: Friday, November 08, 2013 8:59 AM
 To: Prysby, Mike (DEQ)
 Subject: Fwd: DEQ Meeting with Flint City

Can you address back to me your thoughts on David's questions. Thanks.
 John O'

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

From: John O'Malia <jcomalia@gmail.com>
 Date: Fri, Nov 8, 2013 at 8:57 AM
 Subject: Re: DEQ Meeting with Flint City
 To: David Jansen <D_JANSEN@gcdcwws.com>

Will pursue ASAP.
 John O'

On Thu, Nov 7, 2013 at 3:52 PM, David Jansen <D_JANSEN@gcdcwws.com> wrote:

> The Flint River Watershed Coalition has a meeting scheduled with the Commissioner and me on Tuesday. They're going to want to know the implications for the river if Flint puts the plant into operation. Questions to be raised include sludge disposal and implications for recreational use on Holloway and Mott Lake if MDEQ is going to make them implement source water protection plan, and if so, how extensive. See what you can find out, but don't push too hard.
 > Thanks for the quick response, John
 > Best regards,

> Dave

>

> -----Original Message-----

> From: John O'Malia [<mailto:jcomalia@gmail.com>]

> Sent: Thursday, November 07, 2013 3:38 PM

> To: David Jansen; Elgar Brown

> Subject: Re: DEQ Meeting with Flint City

>

> I did not get into the specifics but we can open up, Flint City improvements, for discussion on the 21st. With softening the sludge has to go somewhere for sure. We know the sludge pipeline from the WTP to Bray is shot!

> I can get more info. if needed right away? Monday they have off.

> John O'

>

> On Thu, Nov 7, 2013 at 10:58 AM, David Jansen <D_JANSEN@gcdcwws.com> wrote:

>> John, does this mean that DEQ is going to let them reopen Bray Road?

>>

>> -----Original Message-----

>> From: John O'Malia [<mailto:jcomalia@gmail.com>]

>> Sent: Thursday, November 07, 2013 10:49 AM

>> To: David Jansen; Matt Raysin; Osborn, Larry; Elgar Brown; Prysby,

>> Mike (DNRE)

>> Subject: DEQ Meeting with Flint City

>>

>> As per Mike they are going to operate the plant, with softening, starting in April 2014 when the DWSD contract expires. So, they have to move quickly to improve the plant to manage/produce water 24/7. It sounds like the design will proceed quickly to allow 24/7 operation and much is to be done quickly to meet the deadline. I am sure somethings will slip beyond April but they seem to be in a move quick mode!

>> I told Mike that they would get the 60% PS drawings by say Friday the 8th as they are closed Monday. Larry, I assume that is correct.

>> It appears that moving the meeting to the 21st is going to be OK for review of the PS drawings. They did not seem to have any heartburn with the standards as presented but it will be a good idea to just open that issue up, on the 21st, to be sure it is vetted.

>> All seems to progress.

>> Any questions let me know.

>> John O'.

Rennaker, Joanne (DEQ)

From: Hansen, Jeff <jrhansen@lan-inc.com>
Sent: Friday, February 27, 2015 2:34 PM
To: Busch, Stephen (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: FW: DEQ-Laboratory Report-50201563
Attachments: 50201563-03.PDF; DBP results & other investigation.xlsx

Steve,

Thanks for the table. Flint passed the info on to me earlier today.

I see a discrepancy between your table and Flint's records and we have used Flint's data in the report. I have double checked the lab results and I believe the error is on your end, but that is something to resolve. I've attached what I believe is correct. We have already printed and sent out the report since it is due to you guys Sunday. Samir is hand delivering and will probably be by soon.

Jeffrey R. Hansen
 Senior Project Manager



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

1311 South Linden Road, Suite B • Flint, MI 48532
 T 810.820.2682 C 810.333.3201
www.lan-inc.com • JRHansen@lan-inc.com

From: Brent Wright [<mailto:bwright@cityofflint.com>]
Sent: Friday, February 27, 2015 9:43 AM
To: Hansen, Jeff
Subject: Fwd: DEQ-Laboratory Report-50201563

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

From: Michael Glasgow <mglasgow@cityofflint.com>
Date: Fri, Feb 27, 2015 at 8:09 AM
Subject: Fwd: DEQ-Laboratory Report-50201563
To: Brent Wright <bwright@cityofflint.com>

Here are the DBP results. Everything is great, but this still leaves us in violation at 3 sites, as shown in the other attachment.

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

From: DEQ-DWR-LABREPORTS <DEQ-DWR-LABREPORTS2@michigan.gov>
Date: Thu, Feb 26, 2015 at 4:43 PM
Subject: DEQ-Laboratory Report-50201563
To: "MGLASGOW@CITYOFFLINT.COM" <MGLASGOW@cityofflint.com>

Dear Drinking Water Laboratory Client,

A PDF file containing your analytical results has been attached to this e-mail.

Please do not reply directly to this e-mail. It is an automated account that does not respond to incoming messages.

Please contact the laboratory directly at (517) 335-8184 with questions regarding your report.

Thank you for using the MDEQ Drinking Water Laboratory.

--

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

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003
P.O. Box 30270
Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562



**Sample Number
LF54936**

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	2501 FLUSHING RD, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP #5
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 11:50
Sample Point:	KITCHEN SINK	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	0.003	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	0.005	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.009	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0084	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0023	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0078	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0060	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0245	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003

P.O. Box 30270

Lansing, MI 48909

TEL: (517) 335-8184

FAX: (517) 335-8562

Sample Number

LF54936



TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:

Genesee County Health Dept.

630 South Saginaw

Flint, MI 48502-1540

810 257-3603

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
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Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

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Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562



Sample Number
LF54937

Official Laboratory Report

Report To: **MIKE GLASGOW**
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	3606 CORUNNA RD, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP 4
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 11:35
Sample Point:	BATHROOM	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	0.003	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	0.005	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.009	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0062	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0017	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0058	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0044	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0181	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:

Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

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DRINKING WATER LABORATORY**

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Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562



Sample Number
LF54938

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	3216 MLK BLVD, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP 6
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 12:15
Sample Point:	BATHROOM	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.002	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0093	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0026	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0075	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0091	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0285	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:

Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

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TEL: (517) 335-8184
FAX: (517) 335-8562



Sample Number
LF54939

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	822 S DORT HWY, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP 2
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 10:55
Sample Point:	BATHROOM	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	0.003	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	0.005	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.009	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0066	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0020	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0065	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0048	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0199	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:

Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003



P.O. Box 30270
Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562

Sample Number
LF54940

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	3719 DAVISON RD, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP 1
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 10:39
Sample Point:	KITCHEN	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	0.003	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	0.005	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.009	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0057	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0015	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0054	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0036	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0162	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:

Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003
P.O. Box 30270
Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562



Sample Number
LF54941

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	5018 CLIO RD, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP 7
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 12:34
Sample Point:	BATHROOM SINK	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	0.003	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	0.005	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.009	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0066	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0018	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0060	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0048	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0192	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:

Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003
P.O. Box 30270
Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562



Sample Number
LF54942

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	6204 N SAGINAW ST, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP 8
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 12:51
Sample Point:	BATHROOM SINK	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	0.003	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	0.005	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.009	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0049	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0014	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0048	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0038	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0149	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

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Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003
P.O. Box 30270
Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562



Sample Number
LF54943

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310
Collection Address:	3202 S DORT HWY, FLINT	Source:	TYPE I
Collected By:	KEVIN MCLEOD	Site Code:	DBP 3
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	02/17/2015 11:12
Sample Point:	KITCHEN	Date Received:	02/19/2015 11:12
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Dalapon and Haloacetic						
Bromoacetic acid	Not Detected	02/24/2015	0.001		EPA 552.1/552.2	79-08-3
Bromochloroacetic acid	0.003	02/24/2015	0.001		EPA 552.1/552.2	5589-96-3
Chloroacetic acid	Not Detected	02/24/2015	0.002		EPA 552.1/552.2	79-11-8
Dalapon	Not Detected	02/24/2015	0.001	0.2	EPA 552.1/552.2	75-99-0
Dibromoacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	631-64-1
Dichloroacetic acid	0.005	02/24/2015	0.001		EPA 552.1/552.2	79-43-6
Total Haloacetic Acids (five)	0.009	02/24/2015	NA	0.060	EPA 552.1/552.2	THA-00-C
Trichloroacetic acid	0.002	02/24/2015	0.001		EPA 552.1/552.2	76-03-9
Total Trihalomethanes						
Bromodichloromethane	0.0056	02/20/2015	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0017	02/20/2015	0.0005	0.080	EPA 524.2	75-25-2
Chlorodibromomethane	0.0055	02/20/2015	0.0005	0.080	EPA 524.2	124-48-1
Chloroform	0.0040	02/20/2015	0.0005	0.080	EPA 524.2	67-66-3
Total Trihalomethanes	0.0168	02/20/2015	0.0005	0.080	EPA 524.2	TTHM-00-C

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**Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603**

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AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

DISINFECTION BY-PRODUCTS - DEQ Required Testing

MCL for TTHM = 80 ug/L MCL for HAA5 = 60 ug/L

	May-14		Aug-14		Nov-14		Feb-15		LRAA		MAX	MIN
	TTHM	HAA5	TTHM	HAA5	TTHM	HAA5	TTHM	HAA5	TTHM	HAA5	TTHM	TTHM
Water Plant Tap	56	36	86	36	33	36		36	58.3	36.0	86.0	33.0
	*Once Yearly (June 2014)		*Once Yearly (June 2014)		*Once Yearly (June 2014)		*Once Yearly (June 2014)		*Once Yearly (June 2014)			
Site # 1	162.4	64.0	145.3	43.0	58.6	16.0	16.2	9.0	95.6	33.0	162.4	16.2
Site # 2	111.6	52.0	112.0	40.0	36.2	21.0	19.9	9.0	69.9	30.5	112.0	19.9
Site # 3	96.5	48.0	127.2	31.0	33.3	15.0	16.8	9.0	68.5	25.8	127.2	16.8
Site # 4	106.4	55.0	181.3	24.0	33.9	15.0	18.1	9.0	84.9	25.8	181.3	18.1
Site # 5	75.1	38.0	196.2	11.0	93.6	24.0	24.5	9.0	97.4	20.5	196.2	24.5
Site # 6	82.2	41.0	112.4	25.0	50.1	5.0	28.5	2.0	68.3	18.3	112.4	28.5
Site # 7	88.2	49.0	144.4	30.0	53.6	17.0	19.2	9.0	76.4	26.3	144.4	19.2
Site # 8	79.2	50.0	118.3	37.0	41.1	18.0	14.9	9.0	63.4	28.5	118.3	14.9

*Sampled at end of Oct.

DISINFECTION BY-PRODUCTS - Other TTHM Investigations

	Jul-14	Aug-14	Nov-14
	TTHM	TTHM	TTHM
Dort Reservoir	153.3	n/a	n/a
Cedar Street Reservoir	n/a	163.3	35.2
West Side Reservoir	n/a	134.4	43.9

In house investigation using Parker TTHM Analyzer provided by United Water Affiliate

	10/16/2014	10/17/2014	10/21/2014	10/29/2014
	TTHM	TTHM	TTHM	TTHM
3 MG Well (PS #4)	48.8	49.9	32.2	34.9
+ 1 hour	54.7	52.8	39.2	n/a
+ 48 hours	n/a	n/a	n/a	116.6
+ 170 hours	n/a	n/a	n/a	168.0

Total Organic Carbon (mg

	Raw	Final
May	10.30	4.57
June	9.00	3.63
July	8.44	2.67
August	8.48	4.06
Sept	7.36	3.30
Oct	7.38	2.99
Nov	7.27	3.86
Dec	6.49	2.59
Jan	7.62	3.21
Feb	5.95	2.07

Rennaker, Joanne (DEQ)

From: Rennaker, Joanne (DEQ)
Sent: Friday, June 06, 2014 2:56 PM
To: Busch, Stephen (DEQ)
Subject: FW: DEQ-Laboratory Report-Genesee-2014-05-27
Attachments: GENESEE-2014-05-27.PDF

Jo Anne Rennaker

Secretary

Department of Environmental Quality - Lansing District Office Office of Drinking Water & Municipal Assistance Office of
Waste Management & Radiological Protection

517-284-6643

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

From: DEQ-DWR-LABREPORTS

Sent: Tuesday, May 27, 2014 12:22 PM

To: GCHD-EHWATER@GCHD.US; Graham, Lois (DEQ); Rosenthal, Adam (DEQ); Rennaker, Joanne (DEQ)

Subject: DEQ-Laboratory Report-Genesee-2014-05-27

Dear Drinking Water Laboratory Client,

A PDF file containing your analytical results has been attached to this e-mail.

Please do not reply directly to this e-mail. It is an automated account that does not respond to incoming messages.

Please contact the laboratory directly at (517) 335-8184 with questions regarding your report.

Thank you for using the MDEQ Drinking Water Laboratory.

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003

P.O. Box 30270

Lansing, MI 48909

TEL: (517) 335-8184

FAX: (517) 335-8562



Sample Number
LF19431

Official Laboratory Report

Report To: MICHAEL GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT - WATER PLANT	WSSN/Pool ID:	2310
Collection Address:	4500 N DORT HWY, FLINT	Source:	TYPE I
Collected By:	MICHAEL GLASGOW	Site Code:	PS4
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	05/22/2014 08:30
Sample Point:	SINK	Date Received:	05/22/2014 13:20
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Total Organic Carbon	4.57	05/22/2014	0.5		SM 5310C	TOC-00-C

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Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603

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mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003

P.O. Box 30270

Lansing, MI 48909

TEL: (517) 335-8184

FAX: (517) 335-8562



Sample Number

LF19432

Official Laboratory Report

Report To: MICHAEL GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT/ WATER PLANT	WSSN/Pool ID:	2310
Collection Address:	4500 N DORT HWY, FLINT	Source:	TYPE I
Collected By:	MICHAEL GLASGOW	Site Code:	RAW
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	05/22/2014 08:30
Sample Point:	SINK	Date Received:	05/22/2014 13:20
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Total Organic Carbon	10.3	05/22/2014	0.5		SM 5310C	TQC-00-C

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**Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603**

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

Rennaker, Joanne (DEQ)

From: Rennaker, Joanne (DEQ)
Sent: Friday, June 06, 2014 2:56 PM
To: Busch, Stephen (DEQ)
Subject: FW: DEQ-Laboratory Report-Genesee-2014-05-30
Attachments: GENESEE-2014-05-30.PDF

Jo Anne Rennaker

Secretary

Department of Environmental Quality - Lansing District Office Office of Drinking Water & Municipal Assistance Office of
Waste Management & Radiological Protection

517-284-6643

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

From: DEQ-DWR-LABREPORTS

Sent: Friday, May 30, 2014 12:45 PM

To: GCHD-EHWATER@GCHD.US; Graham, Lois (DEQ); Rosenthal, Adam (DEQ); Rennaker, Joanne (DEQ)

Subject: DEQ-Laboratory Report-Genesee-2014-05-30

Dear Drinking Water Laboratory Client,

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Thank you for using the MDEQ Drinking Water Laboratory.

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003

P.O. Box 30270

Lansing, MI 48909

TEL: (517) 335-8184

FAX: (517) 335-8562



Sample Number

LF19430

Official Laboratory Report

Report To: MICHAEL GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT -WATER PLANT	WSSN/Pool ID:	2310
Collection Address:	4500 N DORT HWY, FLINT	Source:	TYPE I
Collected By:	MICHAEL GLASGOW	Site Code:	LAB TAP
Township/Well#/Section:	//	Collector:	Public Water Supply Operator
County:	Genesee	Date Collected:	05/22/2014 08:30
Sample Point:	PLANT LAB TAP	Date Received:	05/22/2014 13:19
Water System:	Treated Public Distribution System	Purpose:	Routine Monitoring

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Antimony	Not detected	05/23/2014	0.0006	0.006	EPA 200.8	7440-36-0
Arsenic	Not detected	05/23/2014	0.002	0.010	EPA 200.8	7440-38-2
Barium	0.03	05/23/2014	0.01	2	EPA 200.8	7440-39-3
Beryllium	Not detected	05/23/2014	0.0004	0.004	EPA 200.8	7440-41-7
Cadmium	Not detected	05/23/2014	0.0003	0.005	EPA 200.8	7440-43-9
Chloride	79	05/22/2014	4		SM 4500-Cl E	7647-14-5
Chromium	Not detected	05/23/2014	0.01	0.1	EPA 200.8	7440-47-3
Cyanide-Available	Not Detected	05/27/2014	0.02	0.2	OIA-1677	57-12-5
Fluoride	0.16	05/22/2014	0.1	4.0	SM 4500 FC	16984-48-8
Hardness as CaCO3	209	05/22/2014	20		SM 2340 C	HARD-00-C
Iron (automated)	Not detected	05/22/2014	0.1		SM 3500 FeB	7439-89-6
Lead	Not detected	05/23/2014	0.001	0.015	EPA 200.8	7439-92-1
Mercury	Not detected	05/23/2014	0.0001	0.002	EPA 200.8	7439-97-6
Nickel	Not detected	05/23/2014	0.01	0.1	EPA 200.8	7440-02-0
Nitrate as N	0.4	05/22/2014	0.4	10	10-107-04-2-B	14797-55-8
Nitrite as N	Not detected	05/22/2014	0.05	1	10-107-04-2-B	14797-65-0
Selenium	Not Detected	05/23/2014	0.001	0.05	EPA 200.8	7782-49-2
Sodium (automated)	15	05/22/2014	5		SM 3500 NaB	7440-23-5
Sulfate	25	05/22/2014	10		SM 4500 SO4E	14808-79-8
Thallium	Not detected	05/23/2014	0.0002	0.002	EPA 200.8	7440-28-0

Carbamates by HPLC

CAS# : Chemical Abstract Service Registry Number
MCL : Maximum Contaminant Level
AL : Action Level
RL : Reporting Limit

mg/L : milligrams / Liter (ppm)
ppm : parts per million
MPN : Most Probable Number
CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003

P.O. Box 30270

Lansing, MI 48909

TEL: (517) 335-8184

FAX: (517) 335-8562

Sample Number

LF19430

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Carbamates by HPLC						
3 Hydroxycarbofuran	Not Detected	05/27/2014	0.001		EPA 531.2	16655-82-6
Aldicarb	Not Detected	05/27/2014	0.0005		EPA 531.2	116-06-3
Aldicarb sulfone	Not Detected	05/27/2014	0.0005		EPA 531.2	1646-88-4
Aldicarb sulfoxide	Not Detected	05/27/2014	0.0005		EPA 531.2	1646-87-3
Carbaryl	Not Detected	05/27/2014	0.001		EPA 531.2	63-25-2
Carbofuran	Not Detected	05/27/2014	0.0005	0.04	EPA 531.2	1563-66-2
Methiocarb	Not Detected	05/27/2014	0.001		EPA 531.2	2032-65-7
Methomyl	Not Detected	05/27/2014	0.001		EPA 531.2	16752-77-5
Oxamyl	Not Detected	05/27/2014	0.001	0.2	EPA 531.2	23135-22-0
Propoxur	Not Detected	05/27/2014	0.001		EPA 531.2	114-26-1
Chlorinated Acid Herbicides						
2,4,5-T	Not Detected	05/23/2014	0.002		EPA 515.4	93-76-5
2,4,5-TP (silvex)	Not Detected	05/23/2014	0.0003	0.05	EPA 515.4	93-72-1
2,4-D	Not Detected	05/23/2014	0.002	0.07	EPA 515.4	94-75-7
Acifluorfen	Not Detected	05/23/2014	0.004		EPA 515.4	50594-66-6
Bentazon	Not Detected	05/23/2014	0.002		EPA 515.4	25057-89-0
Dicamba	Not Detected	05/23/2014	0.002		EPA 515.4	1918-00-9
Dinoseb	Not Detected	05/23/2014	0.0003	0.007	EPA 515.4	88-85-7
Pentachlorophenol	Not Detected	05/23/2014	0.00006	0.001	EPA 515.4	87-86-5
Picloram	Not Detected	05/23/2014	0.001	0.5	EPA 515.4	1918-02-1
Total DCPA degradates, mono- and di-acid	Not Detected	05/23/2014	0.001		EPA 515.4	1861-32-1
Pesticides Analysis by GC/MS						
4,4'-DDD	Not Detected	05/23/2014	0.001		EPA 525.2	72-54-8
4,4'-DDE	Not Detected	05/23/2014	0.001		EPA 525.2	72-55-9
4,4'-DDT	Not Detected	05/23/2014	0.0005		EPA 525.2	50-29-3
Acetochlor	Not Detected	05/23/2014	0.001		EPA 525.2	34256-82-1
Alachlor	Not Detected	05/23/2014	0.0002	0.002	EPA 525.2	15972-60-8
Aldrin	Not Detected	05/23/2014	0.0004		EPA 525.2	309-00-2
alpha-Chlordane	Not Detected	05/23/2014	0.0002	0.002	EPA 525.2	5103-71-9
Atrazine	Not Detected	05/23/2014	0.0002	0.003	EPA 525.2	1912-24-9
Dieldrin	Not Detected	05/23/2014	0.0005		EPA 525.2	60-57-1
Endrin	Not Detected	05/23/2014	0.0001	0.002	EPA 525.2	72-20-8
Endrin aldehyde	Not Detected	05/23/2014	0.001		EPA 525.2	7421-93-4
gamma-Chlordane	Not Detected	05/23/2014	0.0002	0.002	EPA 525.2	5103-74-2
Heptachlor	Not Detected	05/23/2014	0.0002	0.0004	EPA 525.2	76-44-8
Heptachlor epoxide	Not Detected	05/23/2014	0.0001	0.0002	EPA 525.2	1024-57-3
Hexachlorobenzene	Not Detected	05/23/2014	0.0001	0.001	EPA 525.2	118-74-1

CAS# : Chemical Abstract Service Registry Number

MCL : Maximum Contaminant Level

AL : Action Level

RL : Reporting Limit

mg/L : milligrams / Liter (ppm)

ppm : parts per million

MPN : Most Probable Number

CFU : Colony Forming Unit

Laboratory Contacts

Drinking Water Unit Mgr: Julia Pieper

Systems Mgmt. Unit Mgr: George Krisztian

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003

P.O. Box 30270

Lansing, MI 48909

TEL: (517) 335-8184

FAX: (517) 335-8562

Sample Number

LF19430

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Pesticides Analysis by GC/MS						
Hexachlorocyclohexane (alpha-BHC)	Not Detected	05/23/2014	0.001		EPA 525.2	319-84-6
Hexachlorocyclohexane (beta-BHC)	Not Detected	05/23/2014	0.001		EPA 525.2	319-85-7
Hexachlorocyclohexane (delta-BHC)	Not Detected	05/23/2014	0.001		EPA 525.2	319-86-8
Hexachlorocyclopentadiene	Not Detected	05/23/2014	0.0005	0.05	EPA 525.2	77-47-4
Lindane (gamma-BHC)	Not Detected	05/23/2014	0.0001	0.0002	EPA 525.2	58-89-9
Methoxychlor	Not Detected	05/23/2014	0.0001	0.04	EPA 525.2	72-43-5
Metolachlor	Not Detected	05/23/2014	0.001		EPA 525.2	51218-45-2
Metribuzin	Not Detected	05/23/2014	0.001		EPA 525.2	21087-64-9
Molinate	Not Detected	05/23/2014	0.0005		EPA 525.2	2212-67-1
PCB (aroclor 1016)	Not Detected	05/23/2014	0.0001	0.0005	EPA 525.2	12674-11-2
PCB (aroclor 1221)	Not Detected	05/23/2014	0.0001	0.0005	EPA 525.2	11104-28-2
PCB (aroclor 1232)	Not Detected	05/23/2014	0.0001	0.0005	EPA 525.2	11141-16-5
PCB (aroclor 1242)	Not Detected	05/23/2014	0.0001	0.0005	EPA 525.2	53469-21-9
PCB (aroclor 1248)	Not Detected	05/23/2014	0.0001	0.0005	EPA 525.2	12672-29-6
PCB (aroclor 1254)	Not Detected	05/23/2014	0.0001	0.0005	EPA 525.2	11097-69-1
PCB (aroclor 1260)	Not Detected	05/23/2014	0.0001	0.0005	EPA 525.2	11096-82-5
Polybrominated biphenyls	Not Detected	05/23/2014	0.0001		EPA 525.2	59536-65-1
Simazine	Not Detected	05/23/2014	0.0002	0.004	EPA 525.2	122-34-9
Toxaphene	Not Detected	05/23/2014	0.001	0.003	EPA 525.2	8001-35-2
Volatile Organic Compounds						
1,1 Dichloroethane	Not Detected	05/27/2014	0.0005		EPA 524.2	75-34-3
1,1 Dichloroethylene	Not Detected	05/27/2014	0.0005	0.007	EPA 524.2	75-35-4
1,1 Dichloropropene	Not Detected	05/27/2014	0.0005		EPA 524.2	563-58-6
1,1,1 Trichloroethane	Not Detected	05/27/2014	0.0005	0.2	EPA 524.2	71-55-6
1,1,1,2 Tetrachloroethane	Not Detected	05/27/2014	0.0005		EPA 524.2	630-20-6
1,1,2 Trichloroethane	Not Detected	05/27/2014	0.0005	0.005	EPA 524.2	79-00-5
1,1,2,2 Tetrachloroethane	Not Detected	05/27/2014	0.0005		EPA 524.2	79-34-5
1,2 Dichlorobenzene	Not Detected	05/27/2014	0.0005	0.6	EPA 524.2	95-50-1
1,2 Dichloroethane	Not Detected	05/27/2014	0.0005	0.005	EPA 524.2	107-06-2
1,2 Dichloropropane	Not Detected	05/27/2014	0.0005	0.005	EPA 524.2	78-87-5
1,2,3 Trichlorobenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	87-61-6
1,2,3 Trichloropropane	Not Detected	05/27/2014	0.0005		EPA 524.2	96-18-4
1,2,4 Trichlorobenzene	Not Detected	05/27/2014	0.0005	0.07	EPA 524.2	120-82-1
1,2,4 Trimethylbenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	95-63-6
1,3 Dichlorobenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	541-73-1
1,3 Dichloropropane	Not Detected	05/27/2014	0.0005		EPA 524.2	142-28-9
1,3,5 Trimethylbenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	108-67-8
1,4 Dichlorobenzene	Not Detected	05/27/2014	0.0005	0.075	EPA 524.2	106-46-7

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Sample Number

LF19430

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Volatile Organic Compounds						
2,2 Dichloropropane	Not Detected	05/27/2014	0.0005		EPA 524.2	594-20-7
Benzene	Not Detected	05/27/2014	0.0005	0.005	EPA 524.2	71-43-2
Bromobenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	108-86-1
Bromochloromethane	Not Detected	05/27/2014	0.0005		EPA 524.2	74-97-5
Bromodichloromethane	0.020	05/27/2014	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0010	05/27/2014	0.0005	0.080	EPA 524.2	75-25-2
Bromomethane	Not Detected	05/27/2014	0.001		EPA 524.2	74-83-9
Carbon tetrachloride	Not Detected	05/27/2014	0.0005	0.005	EPA 524.2	56-23-5
Chlorobenzene	Not Detected	05/27/2014	0.0005	0.1	EPA 524.2	108-90-7
Chlorodibromomethane	0.013	05/27/2014	0.0005	0.080	EPA 524.2	124-48-1
Chloroethane	Not Detected	05/27/2014	0.0005		EPA 524.2	75-00-3
Chloroform	0.022	05/27/2014	0.0005	0.080	EPA 524.2	67-66-3
Chloromethane	Not Detected	05/27/2014	0.0005		EPA 524.2	74-87-3
cis-1,2 Dichloroethylene	Not Detected	05/27/2014	0.0005	0.07	EPA 524.2	156-59-2
cis-1,3 Dichloropropene	Not Detected	05/27/2014	0.0005		EPA 524.2	10061-01-5
Dibromomethane	Not Detected	05/27/2014	0.0005		EPA 524.2	74-95-3
Dichlorodifluoromethane	Not Detected	05/27/2014	0.001		EPA 524.2	75-71-8
Dichloromethane	Not Detected	05/27/2014	0.0006	0.005	EPA 524.2	75-09-2
Ethylbenzene	Not Detected	05/27/2014	0.0005	0.7	EPA 524.2	100-41-4
Fluorotrichloromethane	Not Detected	05/27/2014	0.001		EPA 524.2	75-69-4
Hexachlorobutadiene	Not Detected	05/27/2014	0.0005		EPA 524.2	87-68-3
Isopropylbenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	98-82-8
m & p-Xylene	Not Detected	05/27/2014	0.0005	10	EPA 524.2	XYLMP-00-C
Methyl ethyl ketone	Not Detected	05/27/2014	0.005		EPA 524.2	78-93-3
Methyl isobutyl ketone	Not Detected	05/27/2014	0.005		EPA 524.2	108-10-1
Methyl-tert-butyl ether (MTBE)	Not Detected	05/27/2014	0.001		EPA 524.2	1634-04-4
Naphthalene	Not Detected	05/27/2014	0.0005		EPA 524.2	91-20-3
n-Butylbenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	104-51-8
Nitrobenzene	Not Detected	05/27/2014	0.01		EPA 524.2	98-95-3
n-Propylbenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	103-65-1
o-Chlorotoluene	Not Detected	05/27/2014	0.0005		EPA 524.2	95-49-8
o-Xylene	Not Detected	05/27/2014	0.0005	10	EPA 524.2	95-47-6
p-Chlorotoluene	Not Detected	05/27/2014	0.0005		EPA 524.2	106-43-4
p-Isopropyltoluene	Not Detected	05/27/2014	0.0005		EPA 524.2	99-87-6
sec-Butylbenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	135-98-8
Styrene	Not Detected	05/27/2014	0.0005	0.1	EPA 524.2	100-42-5
tert-Butylbenzene	Not Detected	05/27/2014	0.0005		EPA 524.2	98-06-6
Tetrachloroethylene	Not Detected	05/27/2014	0.0005	0.005	EPA 524.2	127-18-4
Tetrahydrofuran	Not Detected	05/27/2014	0.005		EPA 524.2	109-99-9

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DRINKING WATER LABORATORY**

USEPA Region V Drinking Water Cert. No. MI00003
P.O. Box 30270
Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562



**Sample Number
LF19430**

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Volatile Organic Compounds						
Toluene	Not Detected	05/27/2014	0.0005	1	EPA 524.2	108-88-3
Total Trihalomethanes	0.056	05/27/2014	NA	0.080	EPA 524.2	TTHM-00-C
Total Xylenes	Not Detected	05/27/2014	NA	10	EPA 524.2	1330-20-7
trans-1,2 Dichloroethylene	Not Detected	05/27/2014	0.0005	0.1	EPA 524.2	156-60-5
trans-1,3 Dichloropropene	Not Detected	05/27/2014	0.0005		EPA 524.2	10061-02-6
Trichloroethylene	Not Detected	05/27/2014	0.0005	0.005	EPA 524.2	79-01-6
Vinyl chloride	Not Detected	05/27/2014	0.0004	0.002	EPA 524.2	75-01-4

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:

**Genesee County Health Dept.
630 South Saginaw
Flint, MI 48502-1540
810 257-3603**

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Systems Mgmt. Unit Mgr: George Krisztian

Rennaker, Joanne (DEQ)

From: John O'Brien <J_O'BRIEN@gcdcwws.com>
Sent: Wednesday, May 22, 2013 3:43 PM
To: Busch, Stephen (DEQ)
Subject: FW: Dillon Letter
Attachments: SKMBT_65213051611350.pdf

From: John O'Brien
Sent: Wednesday, May 22, 2013 3:38 PM
To: 'buschs@michigan.gov/deq'
Cc: David Jansen
Subject: FW: Dillon Letter

Steve
Here is the DWSD letter to Treasury that I promised you two weeks ago
John O

From: Kevin Sylvester
Sent: Thursday, May 16, 2013 11:36 AM
To: John O'Brien
Subject: Dillon Letter

John,

Attached is the letter from Sue McCormick to Andy Dillon saying they are unable to comply with Snyder's request to calculate a number for purported "stranded" costs.

Kevin A. Sylvester
Communications Director
Genesee County Drain Commissioner's Office
ksylvester@gcdcwws.com
810-701-6514 - Mobile

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
OFFICE OF THE DIRECTOR

735 RANDOLPH STREET
DETROIT, MICHIGAN 48226
WWW.DETROITMI.GOV

April 24, 2013

Mr. Andy Dillon, Treasurer
Michigan Department of Treasury
Lansing, Michigan 48922

Dear Mr. Dillon:

Regarding: Rate Proposal for Flint / Genesee County

As you are aware, during our meeting on Friday, April 20, 2013, the Detroit Water and Sewerage Department (DWSD) was requested to provide a rate proposal to Flint and Genesee County by today based upon the specifications that Flint provided to DWSD on Monday, April 22, 2013. Early this morning, DWSD responded to that request with several documents that were also provided to your office by electronic communication.

In addition to the proposal document, the State of Michigan requested that DWSD include cost figures concerning DWSD's stranded costs associated with capital investment made by DWSD over the years related to serving both Flint and Genesee County as water customers. This issue of "stranded costs" has received significant media attention over the past several months, and my impression is that the State was looking for a clear figure so that there could be subsequent discussion and negotiation over all costs associated with Flint's decision on whether to join Karegondi Water Authority (KWA).

As you may know, State law requires that public utilities such as DWSD must base their rates upon the actual cost of service to particular customers. Additionally, state law limits the length of utility contracts to thirty years, while the useful life of capital assets in the water utility can greatly exceed that thirty year term.

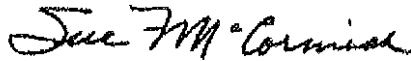
Unfortunately, the computation of stranded costs for DWSD's capital investments in capacity and transmission attributable to Flint's and Genesee's consumption of DWSD water, is a complex calculation that cannot be performed with any level of certainty over the short time period provided by the State of Michigan for this analysis. Further, I have been advised by DWSD's General Counsel that it would not be prudent to engage in a process of trying to guesstimate a price range for such a complex computation.

Mr. Andy Dillon, State Treasurer
April 24, 2013
Page 2

Based upon DWSD's termination of Flint's existing water contract last week, DWSD has roughly twelve months to determine the appropriate cost structure for Flint and Genesee's water consumption over the remaining term of their non-contracted water service from DWSD. DWSD will, however, endeavor to finalize the rate impact of the stranded costs by the end of the current calendar year.

Please rest assure that DWSD's computation will be in accordance with State Law which dictates that such rates will not result in a rate structure that would generate a profit for DWSD. Our intent is simply to compute the rates so that costs properly attributable to Flint and Genesee County will not be borne by the remaining DWSD water customers.

Sincerely,



Sue McCormick
Director

xc: The Honorable Rick Snyder, Governor State of Michigan
Ed Kurtz, Emergency Financial Manager, City of Flint
Kevyn Orr, Emergency Financial Manager, City of Detroit
James Fausone, Chairman, Board of Water Commissioners
William Wolfson, DWSD General Counsel
Nicolette Bateson, DWSD Chief Financial Officer

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, January 14, 2015 8:37 AM
To: Busch, Stephen (DEQ)
Subject: FW: DIR00004 Warner / Water toxins in Flint MI

Steve,

I will prepare the letter and forward to you to finalize...there is a standard opening and closing paragraph with the body based on my discussion with the Flint resident.

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

From: Willard, Veronica (DEQ)
Sent: Wednesday, January 14, 2015 8:23 AM
To: Prysby, Mike (DEQ)
Subject: RE: DIR00004 Warner / Water toxins in Flint MI

This is a reply direct letter, so it can come from you or your supervisor.

From: Prysby, Mike (DEQ)
Sent: Wednesday, January 14, 2015 7:57 AM
To: Willard, Veronica (DEQ)
Subject: FW: DIR00004 Warner / Water toxins in Flint MI

Veronica,

Can you send me the proper format (letter) for me to complete this assignment...."Directors Log letter?" Today is my last day in the office till next week. Thanks.

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

From: Benzie, Richard (DEQ)
Sent: Friday, January 09, 2015 5:24 PM
To: Prysby, Mike (DEQ); Willard, Veronica (DEQ)
Cc: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)
Subject: RE: DIR00004 Warner / Water toxins in Flint MI

Mike,

You need to draft a response that says pretty much what you say below but in a format (letter) that can be used to provide a response to Ms. Warner from someone probably higher up the chain. I assume Joanne can assist you in identifying the appropriate format.

Veronica,

Can you tell from the attachment you sent (DIR00004) whose signature Mike should be preparing this response? All I see is the initials "RD." Will Mike be signing it or will it be someone else?

Also, since we did not receive this request until the afternoon of January 9th, is it possible we may have a week to respond, making the due date January 16th? Mike has his hands full with all of the demands placed on him by the ongoing issues in Flint.

Richard

From: Prysby, Mike (DEQ)
Sent: Friday, January 09, 2015 3:25 PM
To: Willard, Veronica (DEQ)
Cc: Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)
Subject: RE: DIR00004 Warner / Water toxins in Flint MI

Veronica,

I contacted Ms. Patricia Warner and gave her the opportunity to ask me questions and/or voice concerns with the TTHM violation in Flint. Her main complaint, most common complaint across the board, is the high cost of water Flint residents are paying yet receiving water of poor quality. Another concern she voiced was the city's delay in notifying the public of increased TTHM levels. She and others feel the city should have notified residents last May when high TTHM levels were first detected.

I explained to Patricia some of the possible reasons for the increase in water rates included.... improvements needed at the WTP (necessary for full-time operation both for KWA and Flint River operation) and the cost of infrastructure to connect to KWA. The financial commitment to KWA may also be factored into increased costs; however, I stressed that the city needs to work harder at educating the public on why the water rates were increased. With regards to PN requirements, I explained how the TTHM exceedance for Flint is determined (running annual average) and the PN requirement. I stressed that...although the city has met all of the monitoring and PN requirements for this violation, it may be worthwhile for them to convey the status of TTHMs ahead of state and federal reporting deadlines as a means towards regaining public trust. I also provided technical information pertaining to TTHMs and discussed the health-effects in more detail. The duration of the call was a half hour and Patricia seemed satisfied with my response to her questions/concerns. I offered her the opportunity to call me again if she has any further questions.

If any further action is needed regarding this inquiry, please let me know.

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

From: Willard, Veronica (DEQ)
Sent: Friday, January 09, 2015 2:16 PM
To: Prysby, Mike (DEQ)
Cc: Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ)
Subject: FW: DIR00004 Warner / Water toxins in Flint MI

Mike – this is the official assignment.

From: DEQ-LogLetter
Sent: Friday, January 09, 2015 11:36 AM
To: Willard, Veronica (DEQ)
Cc: Thelen, Mary Beth (DEQ); Shaler, Karen (DEQ)
Subject: DIR00004 Warner / Water toxins in Flint MI

Assigned to ODWMA

Rennaker, Joanne (DEQ)

From: Benzie, Richard (DEQ)
Sent: Tuesday, May 13, 2014 1:35 PM
To: Busch, Stephen (DEQ)
Cc: Willard, Veronica (DEQ)
Subject: FW: DIR00107 McCormick / Recent developments involving DWSD's water service to city of Flint and Genesee County
Attachments: ODWMA 14 DIR00107I McCormick.pdf

Please draft a response regarding the reliability of Flint's water supply. I'm not sure DWSD needs to be assured but it's the courteous thing to do and probably makes them drop this issue.

From: Willard, Veronica (DEQ)
Sent: Tuesday, May 13, 2014 11:36:37 AM
To: Benzie, Richard (DEQ)
Cc: Shekter Smith, Liane (DEQ)
Subject: FW: DIR00107 McCormick / Recent developments involving DWSD's water service to city of Flint and Genesee County

Can you forward to appropriate staff to draft a response for the Director's signature? Thank you.

From: DEQ-LogLetter
Sent: Tuesday, May 13, 2014 9:49 AM
To: Willard, Veronica (DEQ)
Cc: Thelen, Mary Beth (DEQ); Sygo, Jim (DEQ); Shaler, Karen (DEQ); Anderson, Madhu (DEQ); Patterson, Leigh (DEQ); Shekter Smith, Liane (DEQ)
Subject: DIR00107 McCormick / Recent developments involving DWSD's water service to city of Flint and Genesee County

Assigned to ODWMA

Letter Buckslip

12-May-14

ID:	DIR00107	Deputy Director _____ Deputy's Mgmt. Asst. _____ Director's Office Staff _____ Division/Office Chief _____ Division/Office Chief's Mgmt. Asst. _____ Prepared by: _____ Division/Office _____ Exec. Div. File No. _____ ☐ Delogged
Date of letter:	5/9/2014	
Date received:	5/12/2014	
Date due:	5/28/2014	
Reply date:		
Last name:	McCormick	
First name:	Sue F.	
Organization:	Detroit Water and Sewerage Department	
Subject:	Recent developments involving DWSD's water service to city of Flint and Genesee County	
Reply to:		
Author:		
Owner:	SHALERK	

<u>Action</u>	<u>Action Date</u>	<u>Due Date</u>	<u>Entity</u>	<u>Signature</u>	<u>Owner</u>	<u>CCs</u>
Assigned 1	5/12/2014	5/28/2014	ODWM A	DIR	SHALERK	Thelen Sygo/Shaler Anderson/Patterson Shekter Smith

Comments: Assigned to ODWMA

Please prepare response for Director's signature if a response is needed.



CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
OFFICE OF THE DIRECTOR

735 RANDOLPH STREET
DETROIT, MICHIGAN 48226
WWW.DETROITMI.GOV

DIR00107

May 9, 2014

Mr. Dan Wyant, Director
Michigan Department of Environmental Quality
525 West Allegan Street
P.O. Box 30473
Lansing, MI 48909-7973

Director Wyant:

Regarding: City of Flint

I am writing this letter to keep the Michigan Department of Environmental Quality ("MDEQ") informed of recent developments involving the Detroit Water and Sewerage Department ("DWSD") and the City of Flint. As you are already aware, DWSD gave notice to the City of Flint in April of 2013, that it was terminating the City's contract for water service with DWSD. Pursuant to that notice, there has been on-going communication and negotiation between DWSD and the City of Flint regarding DWSD's willingness to continue to provide service to both Flint and Genesee County as non-contract customers of DWSD, until such time as either or both enter into a new long-term contract with DWSD.

As of May 1, 2014, the City of Flint stopped taking water from DWSD. DWSD staff, together with staff from Genesee County, confirmed that the valves were closed and we have noted the reduction in meter flow at our FL-01 meter to confirm this information. Further, the City of Flint has verbally informed DWSD that it does not require DWSD to provide the City with any redundancy options for water service. While DWSD has requested Flint to provide confirmation from MDEQ on this point, we have yet to receive that assurance in writing.

At the present time, DWSD continues to provide water to Genesee County. We also remain in active negotiations with Genesee County on a long-term water service and back-up service contract.

Should you have any questions regarding these matters, please do not hesitate to contact me at (313) 224-4701.

Sincerely yours,

A handwritten signature in cursive script that reads "Sue F. McCormick".

Sue F. McCormick
Director

cc: Leann Shekter-Smith, MDEQ

Rennaker, Joanne (DEQ)

From: Dykema, Linda D. (DCH)
Sent: Tuesday, July 28, 2015 3:25 PM
To: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)
Subject: FW: Director's Office Assignment -- Flint - need update asap
Attachments: Flint Testing and EBLLs_2.xlsx

Hi,

I just wanted to make you aware of this analysis.

Linda D. Dykema, Ph.D.
 Environmental Public Health Director
 Division of Environmental Health
 Michigan Department of Health & Human Services
 517.335.8566
 dykema@michigan.gov

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

From: Peeler, Nancy (DCH)
Sent: Tuesday, July 28, 2015 2:57 PM
To: Anderson, Paula (DCH); Miller, Corinne (DCH); Travis, Rashmi (DCH); Moran, Susan (DCH); Grijalva, Nancy (DCH); Fink, Brenda (DCH)
Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)
Subject: RE: Director's Office Assignment -- Flint - need update asap

I apologize for the delay in responding more specifically to this assignment, it took some time to review our Childhood Lead Poisoning Prevention program data to see if it might contribute to the understanding of the situation in Flint with their water supply. Here is what we found:

We looked at lead testing results for May 2014-April 2015, which is the 12 month time frame just after Flint started drawing their water from the river (water source changed in April 2014). We compared lead testing rates and lead testing results to the same time frame for the previous 3 years, to see if there were any patterns that suggested that there were increased rates of lead poisoning after the water supply was switched. Per the attached charts –

- Lead testing rates remained about the same from year to year (chart on the right).
- There was a spike in elevated blood lead tests from July-September 2014 (chart on the left, gold line).
- However that pattern was not terribly different from what we saw in the previous three years, especially in 2011-2012 (we are working with our Epidemiologist to statistically verify any significant differences).
- We commonly see a 'seasonal effect' with lead, related to people opening and closing windows more often in the summer, which disturbs old deteriorating paint on the windows, sills and sashes. Window fans frequently blow and spread the lead dust from the deteriorating paint to other parts of the room/house. We suspect that the summer data spike may be related to this effect.
- If the home water supply lines and/or river water were contributing to elevated blood lead tests, we expected that the increased rates would extend beyond the summer, but they drop quite a bit from September to October, stayed low over the winter, and are just starting to tail up again in the spring of 2015.

So upon review, we don't believe our data demonstrates an increase in lead poisoning rates that might be attributable to the change in water source for Flint. We recognize that lead exposure via the water is only a small piece of what may be happening for families in Flint, however, we hope the information is helpful.

Nancy Peeler

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

From: Anderson, Paula (DCH)

Sent: Wednesday, July 22, 2015 5:31 PM

To: Miller, Corinne (DCH); Travis, Rashmi (DCH)

Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Peeler, Nancy (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)

Subject: Director's Office Assignment -- Flint - need update asap

Importance: High

Good afternoon,

Please see the message below received from the Director's office just before 5. If at all possible, please provide an update of what you may, or may not, know ASAP, today if at all possible. Include Nancy Grijalva and Sue Moran in the response. Thank you.

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

From: Miller, Mark (DCH)

Sent: Wednesday, July 22, 2015 5:28 PM

To: Anderson, Paula (DCH)

Subject: RE: Flint - need update asap

There's an article from the metro times I located:

<http://www.metrotimes.com/Blogs/archives/2015/07/14/flint-family-finds-hazardous-waste-levels-of-lead-in-its-tap-water>

Based on this it sounds like at least one family might have had a child with elevated lead blood levels, which might or might not have come from the water. Sounds like the issue is old lead service lines, but there seems to be some difference of opinion on appropriate testing methods.

I'd send this over to Linda Dykema, Wes Priem and Nancy Peeler for their comments.

DEQ has jurisdiction over municipal water supplies, but we do have a program to follow-up on children with elevated blood lead levels, so I think it would be appropriate for the folks above to discuss the situation and recommend any action.

Mark

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

From: Anderson, Paula (DCH)

Sent: Wednesday, July 22, 2015 4:51 PM

To: Miller, Mark (DCH)

Cc: Moran, Susan (DCH)

Subject: FW: Flint - need update asap

Importance: High

Nancy requested an answer TODAY. Thanks.

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

From: Grijalva, Nancy (DCH)

Sent: Wednesday, July 22, 2015 4:47 PM

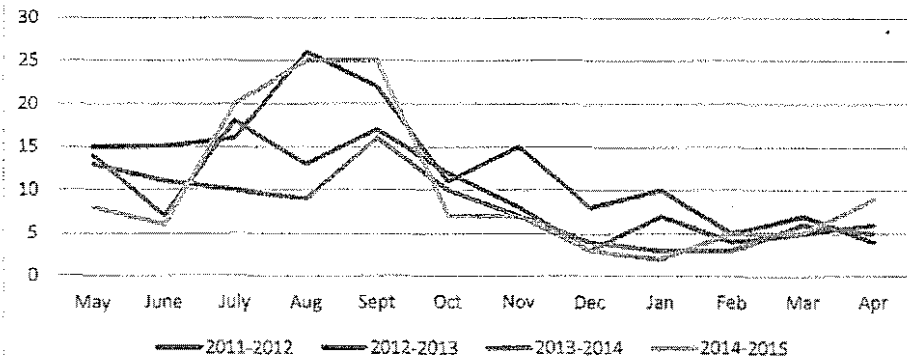
To: Moran, Susan (DCH)

Cc: Anderson, Paula (DCH)

Subject: FW: Flint - need update asap

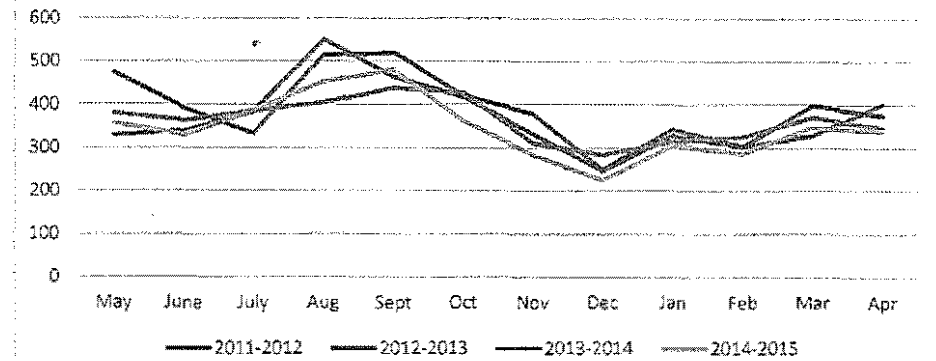
I'm frustrated by the water issue in Flint. I really don't think people are getting the benefit of the doubt. Now they are concerned and rightfully so about the lead level studies they are receiving from the DEQ samples. Can you take a moment out of your impossible schedule to personally take a look at this? These folks are scared and worried about the health impacts and they are basically getting blown off by us (as a state we're just not sympathizing with their plight).

City of Flint, Children less than 16 years of age
with First-Time Elevated Blood Lead Levels

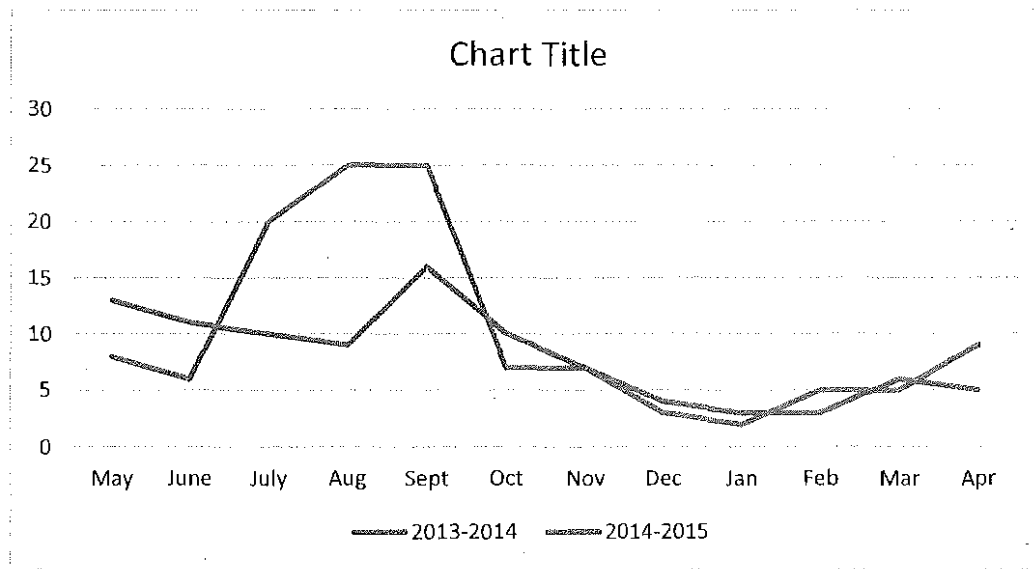


	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2011-2012	15	15	16	26	22	11	15	8	10	5	7	4
2012-2013	14	7	18	13	17	12	8	3	7	4	5	6
2013-2014	13	11	10	9	16	10	7	4	3	3	6	5
2014-2015	8	6	20	25	25	7	7	3	2	5	5	9

City of Flint, Children less than 16 years of age
Tested for Lead Poisoning



	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2011-2012	474	393	332	513	520	420	379	249	343	303	399	375
2012-2013	328	338	383	550	464	417	332	246	328	303	328	402
2013-2014	380	363	385	404	438	427	310	283	313	325	371	346
2014-2015	356	329	386	452	480	361	283	224	305	287	348	339



Rennaker, Joanne (DEQ)

From: Dykema, Linda D. (DCH)
Sent: Thursday, July 23, 2015 10:08 AM
To: Busch, Stephen (DEQ); Philip, Kris (DEQ); Shekter Smith, Liane (DEQ)
Subject: FW: Director's Office Assignment -- Flint - need update asap

FYI - this is what I sent up to my front office. Thanks for your help Steve.

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

From: Dykema, Linda D. (DCH)
Sent: Thursday, July 23, 2015 10:07 AM
To: Miller, Corinne (DCH); Peeler, Nancy (DCH); Anderson, Paula (DCH); Travis, Rashmi (DCH); Grijalva, Nancy (DCH); Moran, Susan (DCH)
Cc: Priem, Wesley F. (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH); Fink, Brenda (DCH); Groetsch, Kory J. (DCH)
Subject: RE: Director's Office Assignment -- Flint - need update asap

I spoke with Steve Busch, Lansing District Office manager, DEQ Office of Drinking Water & Municipal Assistance.

The city of Flint recently conducted drinking water testing throughout the city with special attention to those areas known to have old service lines. The city water supply is in compliance with the lead rule, which means that 90% of the water samples were less than the lead action level of 15 ppb. DEQ will, however, recommend that Flint further "optimize" their corrosion control methods. The DEQ has not seen a change in the city's compliance with the lead rule since switching to the Flint River source.

Some water samples had lead levels above 15 ppb. Homeowners receive their sampling results and those with elevated levels are provided with information regarding how to minimize their exposure, including replacement of water supply lines. The city pays for line replacement from the main to the property boundary. The property owner is responsible for some portion of the cost if the line replaced is on their property. To Steve's knowledge, there is no program in Flint to assist homeowners with limited financial means.

Regarding the home with high drinking water lead levels: some years ago the supply line that serves the neighborhood was replaced, but somehow this house was not connected to the new line, such that the family's drinking water supply was coming from the old corroded lead pipe. None of the neighbors water had elevated lead levels, which was likely why she was temporarily connected by garden hose to a tap supplied by the new line. She has since been permanently connected to the new line.

Regarding the EPA drinking water official quoted in the press articles: the report that he issued was a result of his own research and was not reviewed or approved by EPA management. He has essentially acted outside his authority.

Rennaker, Joanne (DEQ)

From: Dykema, Linda D. (DCH)
Sent: Thursday, July 23, 2015 11:00 AM
To: Busch, Stephen (DEQ); Shekter Smith, Liane (DEQ)
Subject: FW: Director's Office Assignment -- Flint - need update asap

FYI - Mark Johnson is the ATSDR senior regional rep in the Chicago office. I've told him that my staff are not planning a public health assessment, but I thought you should know about this interest at the national level.

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

From: Johnson, Mark [<mailto:johnson.mark@epa.gov>]
 Sent: Thursday, July 23, 2015 10:48 AM
 To: Dykema, Linda D. (DCH); Groetsch, Kory J. (DCH); Gray, Jennifer (DCH); Quiggle, Lisa (DCH); Manente, Susan (DCH)
 Subject: RE: Director's Office Assignment -- Flint - need update asap

Linda

Thanks for the additional information. As a follow-up to my earlier message, the National Science Foundation is apparently arranging funding to several investigators to evaluate the engineering aspects of the Flint water system to find a solution. Although Flint has initiated plans to construct a water line that will tap into Lake Huron as their water source, they may still have issues with their aging water distribution system.

NIEHS wanted to know if ATSDR, MDHHS, or Flint Health Dept is planning to evaluate the public health implications of the problems in the water system. As you know, NCEH has both a Safe Water Program and a Lead Program that could possibly be involved, but only at the request of the state. If the elevated lead exposure is limited to just this one residence that has since been remediated, then federal involvement would not seem to be appropriate. Let me know if there is something more to evaluate.

Mark

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

From: Dykema, Linda D. (DCH) [<mailto:DykemaL@michigan.gov>]
 Sent: Thursday, July 23, 2015 9:10 AM
 To: Johnson, Mark; Groetsch, Kory J. (DCH); Gray, Jennifer (DCH); Quiggle, Lisa (DCH); Manente, Susan (DCH)
 Subject: FW: Director's Office Assignment -- Flint - need update asap

FYI - our Director's office asked for information, so I called DEQ for the scoop.

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

From: Dykema, Linda D. (DCH)
 Sent: Thursday, July 23, 2015 10:07 AM
 To: Miller, Corinne (DCH); Peeler, Nancy (DCH); Anderson, Paula (DCH); Travis, Rashmi (DCH); Grijalva, Nancy (DCH); Moran, Susan (DCH)
 Cc: Priem, Wesley F. (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH); Fink, Brenda (DCH); Groetsch, Kory J. (DCH)
 Subject: RE: Director's Office Assignment -- Flint - need update asap

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Regarding the EPA drinking water official quoted in the press articles: the report that he issued was a result of his own research and was not reviewed or approved by EPA management. He has essentially acted outside his authority.

Rennaker, Joanne (DEQ)

From: Donaldson, Kristina (DEQ)
Sent: Thursday, October 29, 2015 11:21 AM
To: Benzie, Richard (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: FW: DWSD Emergency Water Service to City of Flint
Attachments: DocFlint Letter and Contract 101615.pdf

You probably already have this... FYI

From: teresa@projectinnovations.com [<mailto:teresa@projectinnovations.com>]
Sent: Thursday, October 29, 2015 9:45 AM
To: Donaldson, Kristina (DEQ)
Subject: DWSD Emergency Water Service to City of Flint

Attached is the letter and contract regarding the DWSD emergency water service agreement with the City of Flint.



CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
OFFICE OF THE DIRECTOR

735 RANDOLPH STREET
DETROIT, MICHIGAN 48226-2830
WWW.DETROITMI.GOV

October 26, 2015

Dear Valued Water Customer:

Regarding: Restoration of Emergency Water Service to City of Flint

I write to you today with a remarkable example of a collaborative and cooperative effort in difficult times. On October 14, 2015, the Board of Water Commissioners authorized me to negotiate and, in consultation with Board Chairman Fausone, execute an agreement to restore water service to the City of Flint. On October 16, 2015, a final agreement to provide emergency water service to Flint was executed and Flint began receiving water from the Detroit Water and Sewerage Department (DWSD) system that same evening.

Here are some highlights of the agreement:

- The agreement has a nine (9) month term which may be extended by mutual agreement assuming the public health risk remains, and an alternative supply source is not available.
- Flint will transfer to DWSD ten million dollars as an estimated pre-payment for the services for the nine (9) month term, which is based on the annual volume, max day and peak hour values stated in Exhibit B of the agreement. Two million dollars was transferred on October 16, and the remainder was received on October 19. This estimated prepayment does not relieve Flint from its obligation to pay for all actual charges for services.
- In addition to the estimated prepayment, Flint has agreed that DWSD bills constitute an account stated, and will not oppose an action to collect.
- Flint agrees to defend and indemnify DWSD from any actions resulting from the provision of water under this agreement and Flint's distribution of that water.
- As recommended by its environmental consultant, Flint will be allowed to add phosphate to the DWSD water to coat its pipes and stem future lead leeching. DWSD and Flint will coordinate efforts to ensure that customers are aware of this, and that there may be some transitional water quality issues remaining after reconnection while Flint's system is fully flushed.
- The Genesee County Drain Commissioner (GCDC) and Flint have agreed that Flint may be served through GCDC's master meter connection to the DWSD system. GCDC has a second meter by which GCDC will deduct from the DWSD master meter to determine the Flint usage, and will provide DWSD with a monthly report of Flint's usage.
- The agreement may and is expected to be assigned to the Great Lakes Water Authority.



October 26, 2015
Page 2

A copy of the agreement with Flint has been attached for your reference. We are pleased to provide this emergency assistance to the City of Flint and its residents in this time of need, and hope this information will answer any questions or concerns you may have regarding the contractual arrangement between the parties. However, should you find you have additional questions regarding this matter, please contact Laurie Koester, Associate General Counsel, at (313) 964-9620.

Sincerely,

Sue F. McCormick
Director

WATER SERVICE CONTRACT
BETWEEN
CITY OF DETROIT
AND
CITY OF FLINT

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**WATER SERVICE CONTRACT
BETWEEN
CITY OF DETROIT
AND
CITY OF FLINT**

This Water Service Contract ("Contract") is made between the City of Detroit, a municipal corporation, by its Water and Sewerage Department and Board of Water Commissioners (the "Board"), and the City of Flint, a municipal corporation ("Customer"). The Board and Customer may be referred to individually as "Party" or collectively as the "Parties."

Whereas, the City of Detroit owns a public water supply system ("System") operated by the Board; and

Whereas, the Board supplies water service to numerous governmental entities in the Board's water service area; and

Whereas, Customer is experiencing a public health emergency and desires to obtain water service from the Board in order to abate this emergency; and

Whereas, the purpose of this Contract is to provide potable water to Customer on an emergency basis; and

Whereas, because Customer shall receive water through a Board-owned master meter that also meters water usage by the Genesee County Drain Commissioner ("GCDC"), Customer has entered into a metering agreement with GCDC whereby GCDC agrees to report to the Board the volume of water attributable to Customer; and

ACCORDINGLY, THE PARTIES AGREE AS FOLLOWS:

**Article 1.
Definitions**

1.01 The following words and expressions, or pronouns used in their stead, shall be construed as follows:

"Adjusted Prevailing Water Rate" shall have the meaning ascribed in Article 3 herein.

"Allocation Flow Rate" shall mean the value that is established as a result of a breach of Section 5.03 herein and which value shall replace the contractual Maximum Flow Rate in the rate calculation process in the event that Section 5.04(C) herein is applied by the Board.

"Annual Volume" shall mean the actual volume of water used by Customer for the period of July 1st to June 30th as measured on bills issued from August 1st through July 31st.

"Board" shall mean the City of Detroit Board of Water Commissioners.

"City" shall mean the City of Detroit, a municipal corporation, acting through its Board of Water Commissioners.

"Contract" shall mean each of the various provisions and parts of this document, including all attached Exhibits and any amendments thereto, as may be executed and approved by Customer's governing body and the Board of Water Commissioners.

"Contract Term" shall have the meaning ascribed in Article 2 herein.

"Customer" shall mean the Party that enters into a contract with the City of Detroit by way of this Contract, whether an authority, city, township, village or other municipal corporation recognized by the State of Michigan.

"Customer Maximum Day Demand" shall mean the Customer's recorded water usage on the DWSD Maximum Day. Customer Maximum Day Demand shall, in conjunction with Customer Peak Hour Demand, be a component of its Maximum Flow Rate.

"Customer Peak Hour Demand" shall mean the Customer's recorded water usage during the DWSD Peak Hour. Customer Peak Hour Demand, in conjunction with Customer Maximum Day Demand, shall be a component of its Maximum Flow Rate.

"DWSD" shall mean the City of Detroit Water and Sewerage Department.

"DWSD Maximum Day" shall mean the maximum reported water production day for the System during any twenty-four hour period as measured from 12:00 a.m. Eastern Standard Time in any given calendar year, as determined by DWSD in reviewing water production and storage reports.

"DWSD Peak Hour" shall mean the hour during the DWSD Maximum Day in which the most water is delivered to the System, measured from top-of-the-hour to top-of-the-hour (e.g. 7:00 a.m. to 8:00 a.m.), and as determined by DWSD in reviewing water production and pumping reports. In calculating the DWSD Peak Hour, the time period from 11:00 PM to 5:00 AM Eastern Standard Time (EST) shall not be considered provided, however, that if Customer has an approved Filling Schedule, the time period specified in the Filling Schedule shall supersede the time period of 11:00 PM to 5:00 AM EST.

"Early Termination Costs" shall have the meaning ascribed in Article 3 herein.

"Filling Schedule" shall have the meaning ascribed in Article 22 herein.

"Maximum Flow Rate" shall mean the aggregate amount of water usage that Customer commits not to exceed, as determined by the Customer Maximum Day Demand and the Customer Peak Hour Demand, collectively.

"Meter Facilities" shall mean a location in which a water meter is housed including, without limitation, meter pits and meter vaults.

"Minimum Annual Volume" shall mean fifty percent of Customer's Projected Annual Volume.

"Notices" shall mean all notices, consents, approvals, requests and other communications required to be given under the terms of this Contract.

"Pressure Problem" shall have the meaning ascribed in Article 5 herein.

"Pressure Range" shall have the meaning ascribed in Article 5 herein.

"Projected Annual Volume" shall mean the projected annual water sales to Customer as set forth in Exhibit B.

"Service Area" shall mean the mutually agreed upon area where Customer is permitted to distribute water received from the Board under the terms of this Contract which (a) may be entirely within the corporate limits of Customer or may exceed the corporate limits of Customer and (b) which may or may not include the entire geographical area within the Customer's corporate limits.

"System" shall mean the public water works system owned and operated by the City of Detroit, acting through its Board of Water Commissioners and its Water and Sewerage Department.

"Technical Advisory Committee" shall mean the committee consisting of representatives of the Detroit Water and Sewerage Department, wholesale water customers of the Detroit Water and Sewerage Department and their respective representatives, and shall include its successor or replacement if altered or discontinued. The Technical Advisory Committee or its successor shall remain in existence for a minimum term of January 1, 2008 until December 31, 2038 unless the committee determines otherwise.

"Water Distribution Points" shall have the meaning ascribed in Article 4 herein.

Article 2. Contract Term

- 2.01 Term. The Board shall sell and supply water to Customer from the System in accordance with the terms of this Contract for a period of nine months from the effective date of this Contract (the "Contract Term"), subject to Article 3 herein. The effective date of this Contract shall be the date that this Contract is approved by the Customer's governing body or the Board whichever is later.
- 2.02 Extension of Term. Should the concern for public health continue beyond the initial Contract Term and a reasonable alternative to the temporary service provided by the Board does not readily exist, the Contract Term may be extended for any mutually agreeable period through a letter which sets forth the emergent circumstances signed by the Parties.
- 2.03 Reserved.

**Article 3.
Early Termination Costs**

- 3.01 Early Termination Costs. In addition to any other remedies provided for by law or by the terms of this Contract, Customer shall be liable to the Board for the payment of any costs incurred by the Board related to providing water to Customer in the event Customer terminates this Contract before the conclusion of a Contract Term ("Early Termination Costs"), unless Customer terminates this Contract for cause in accordance with Article 10; provided, however, that payment of such Early Termination Costs by Customer shall not entitle Customer to receive water service from the Board.
- 3.02 Calculation of Costs. Payment of Early Termination Costs will be calculated by applying the Adjusted Prevailing Water Rate to the Minimum Annual Volume requirements for the remainder of the Contract Term. The Adjusted Prevailing Water Rate shall be the rate charged by the Board to Customer as of Customer's effective termination date, adjusted annually to reflect projected inflationary increases utilizing a locally based wholesale price index. The Parties may agree upon another standardized price index. The Board may seek a recommendation from the Technical Advisory Committee on the amount of the Early Termination Costs.
- 3.03 Specifically Constructed Facilities. If the Board has constructed facilities specifically for the benefit of Customer, additional costs may be included in the calculation of the Early Termination Costs, provided that any such facilities shall be identified in a written agreement between the Board and Customer at or near the time of construction.
- 3.04 Formation of Water Authority. Customer may join with another authority, city, township, village or other municipal corporation recognized by the State of Michigan to form a water authority for the sole purpose of collectively contracting for water service from the Board. The exercise of this right shall not be construed as an early termination of this Contract and this Contract shall be voided upon the approval of a new water service contract by Customer's governing body and the Board.
- 3.05 Customer Annexation or Consolidation. In the event the territory of Customer is annexed or consolidated with another Michigan municipal corporation and if said municipal corporation is a current customer of the Board, then such an annexation or consolidation shall not be construed as an early termination of this Contract and this Contract shall be voided upon the approval of a new or amended water service contract with the annexing or consolidating municipal corporation.

**Article 4.
Service Area**

- 4.01 Delivery Location. Water shall be delivered by the Board to Customer at the location(s) identified in Exhibit A (collectively, the "Water Distribution Points"), and at other locations as may be mutually agreed upon in writing by the Board and Customer. The Board shall not require Customer to pay any fee to reconnect to the System. The Customer shall bear any and all actual costs, including without limitation capital and labor costs, associated with any work required to reconnect Customer to the System.

- 4.02 Limit of Responsibility. The Board shall have no responsibility for distributing, operating, repairing, replacing and maintaining any portions of the Customer's water supply system downstream of the Water Distribution Points shown in Exhibit A, provided, however, that this Section 4.02 does not prevent the application of the provisions of Section 11.02 herein.
- 4.03 Board Responsibility. The Board owns and is responsible for operating and maintaining all parts of its System upstream from Customer's Water Distribution Points. Should the Board fail to maintain its Meter Facilities and/or any Board owned and maintained equipment within the Meter Facilities, Customer shall provide written notice to the Board which describes the objectionable condition of the Meter Facility and/or the equipment within, and its intent to take reasonable steps to maintain the condition and charge the reasonable cost of doing so to the Board. Upon receipt of the notice and subject to Section 11.01, the Board shall have thirty calendar days to repair the condition specified in the notice, unless a force majeure event prevents the repair within the thirty-day period. If the Board has not repaired the condition at the conclusion of the thirty-day period and has not provided a written explanation to Customer explaining the reason for the delay (e.g. necessary parts are on order or occurrence of a force majeure event specified in Section 11.01), then Customer may take reasonable steps to maintain the specified condition and charge the reasonable cost of doing so to the Board.
- 4.04 Extension of Service Area. Customer's distribution of water supplied by the Board shall be limited to the Service Area stated in Exhibit A. The Parties agree that situations may arise in which Customer desires to extend its Service Area, either temporarily or permanently, beyond its corporate limits. Should such a situation arise, Customer shall provide written notice to the Board explaining the nature, duration and extent of the requested Service Area extension. The Board shall have the option, which it may exercise at any time, of requiring a written amendment to this Contract to accommodate the change in Service Area. Should the Board determine that an immediate amendment is required, the Parties shall, within thirty calendar days of Customer's request, meet to negotiate mutually agreeable terms for the extension of the Service Area. The Board shall not unreasonably deny a request to extend the Service Area.
- 4.05 Change or Addition of Water Distribution Points. Water Distribution Points may be added or changed only by the express written agreement of the Board and Customer and shall be embodied in a written amendment to this Contract.
- 4.06 Sole Supplier. Except as provided in Article 17 herein, the Board shall be the sole supplier of public potable water to Customer's Service Area.

Article 5.

Pressure; Maximum Flow Rate; Minimum Annual Volume

- 5.01 Pressure Range. The Board shall use its best efforts to deliver water at the Water Distribution Points at a pressure range ("Pressure Range") adequate to meet the reasonable requirements of Customer. For purposes of evaluating this effort, water pressure shall be determined by reviewing the average hourly pressure measured from top-of-the-hour to top-of-the-hour (e.g. 7:00 a.m. to 8:00 a.m.). The Pressure Range to be provided by the Board to Customer's Water Distribution Points is specified in Exhibit B. The location at

which the water pressure will be measured shall be specified in Exhibit A and identified as point "P". A Pressure Range will not be established for water meters that are not located on a DWSD transmission main, or which are located on a DWSD transmission main and are downstream of and subject to the flow demands of a water meter for another Board customer.

5.02 Remedy for Non-Compliance with Pressure Range. If the water pressure at Customer's Water Distribution Points is above or below the Pressure Range, at Customer's request the Parties shall meet within thirty calendar days to discuss the reasons for the non-compliance and, if agreed necessary, develop and implement a mutually agreeable written corrective action plan within sixty calendar days of the meeting, or as otherwise agreed. The corrective action plan shall include a timetable for resolution of the non-compliance issue(s).

- A. If it is determined that another customer's exceedance of the rates of flow established by that customer's Maximum Flow Rate caused or contributed to the Board's inability to meet its Pressure Range agreement with Customer, then the corrective action plan shall provide for the resolution of the issue.
- B. If Customer is exceeding the rates of flow established by its Maximum Flow Rate on a day other than the DWSD Maximum Day at the time Customer experiences a variation from the Pressure Range, then the Board shall be relieved from its obligation to provide water to Customer within the Pressure Range for that period of time during which Customer is exceeding the rates of flow established by its Maximum Flow Rate.

5.03 Maximum Flow Rate. Customer's Maximum Flow Rate is specified in Exhibit B. Customer shall not exceed the Maximum Flow Rate specified in Exhibit B, as measured in million gallons on the DWSD Maximum Day and during the DWSD Peak Hour.

- A. The Board shall notify all customers in writing on or before October 1 of each calendar year if Customer or any other wholesale customer is alleged to have exceeded its Maximum Flow Rate in a given calendar year. The notice shall state the day and/or hour that Customer or any other wholesale water customer is alleged to have exceeded its Maximum Flow Rate.
- B. If Customer is alleged to be in breach of its obligations under this Section 5.03, the Board and Customer shall endeavor to meet before November 1 of the current calendar year, or as soon as practicable, for the purposes of validating the breach, reviewing and analyzing the causes, and to negotiate a possible remedy pursuant to Sections 5.04 and 5.05 herein.
- C. The Technical Advisory Committee's Analytical Work Group, or its successor shall review any alleged breach of this Section 5.03.
 - i. The Analytical Work Group shall meet once, at a minimum, on or before November 1 of each calendar year to review the alleged breaches, if any,

and may thereafter schedule subsequent meetings as necessary to conclude its review.

- ii. The Board will seek a recommendation from the Analytical Work Group on (1) an Allocation Flow Rate, if any, and/or (2) concurrence with the remedy tentatively negotiated between Customer and the Board, if any. Customer and the Board shall have the right to present any information related to the alleged breach a Party deems necessary to the deliberations.
- iii. Any recommendation submitted by the Analytical Work Group shall be received by the Board on or before December 1 of each calendar year.

5.04 Remedy for Non-Compliance with Maximum Flow Rate. The Board has no obligation to supply to Customer more than the Maximum Flow Rate. If Customer exceeds its Maximum Flow Rate on the DWSD Maximum Day or during the DWSD Peak Hour, the Board and Customer may, as needed, take one or more of the following actions set forth in this Section 5.04. The applicability of any particular action shall be evaluated by the Board on a case-by-case basis.

- A. The Board may require that Customer take all reasonable steps to reduce its consumption to the Maximum Flow Rate. Such steps may include water conservation measures, outdoor water use restrictions, water loss studies and remediation, and an internal system operation evaluation.
- B. The Parties may meet to negotiate a new Maximum Flow Rate. If so negotiated, Customer shall pay the rate associated with the new Maximum Flow Rate in the subsequent rate year.
- C. For ratemaking and cost allocation purposes only, the Board may recalculate Customer's rate for the current and/or subsequent fiscal years utilizing a revised cost allocation formula as follows:
 - i. The Board shall, as set forth below, establish an Allocation Flow Rate to replace the contractual Maximum Flow Rate in the rate calculation process.
 - ii. The Allocation Flow Rate shall be applied from no earlier than the first exceedance date forward.
 - iii. The Allocation Flow Rate will be at least equal to the flow rate demonstrated by Customer on the DWSD Maximum Day, and may be higher than the actual flow rate demonstrated by Customer.
 - iv. Pursuant to Section 5.03(C), if the Board receives a recommendation on the Allocation Flow Rate to be applied from the Analytical Work Group and the recommendation is higher than twice the amount by which the demonstrated flow rate exceeded the original Maximum Flow Rate, then the Board shall be limited to establishing an Allocation Flow Rate that is at least equal to the flow rate demonstrated by Customer on the DWSD Maximum

Day and no higher than the recommendation provided by the Analytical Work Group.

- v. If no recommendation on the Allocation Flow Rate to be applied is received by the Board, or if the Board receives a recommendation and the recommendation is less than twice the amount by which the demonstrated flow rate exceeded the original Maximum Flow Rate, then the Board shall be limited to establishing an Allocation Flow Rate that is at least equal to the flow rate demonstrated by Customer on the DWSD Maximum Day and no higher than twice the amount by which the demonstrated flow rate exceeded the original Maximum Flow Rate.
- vi. The Allocation Flow Rate will continue to be applied to each subsequent year's rate calculation process until the Maximum Flow Rate is renegotiated.
- vii. If a rate has been approved for the subsequent fiscal year (July 1st to June 30th) but the rate has not yet been applied, the Board may modify Customer's rate for that subsequent fiscal year to account for an exceedance of its Maximum Flow Rate.
- viii. If the Board has built capital facilities based upon Customer's negotiated Maximum Flow Rate and Customer consistently exceeds its Maximum Flow Rate, then the Board may re-calculate the amount of Customer's percentage of the capital cost of such facilities

5.05 Procedure for Non-Compliance with Maximum Flow Rate. In addition to the remedies specified in Section 5.04, if Customer has failed in its obligations under Section 5.03, the Parties shall meet to discuss the reasons for the non-compliance and if agreed necessary, develop a mutually agreeable written corrective action plan by December 31 of the year in which the non-compliance occurred, or as otherwise agreed. Any corrective action plan required under this Section 5.05 shall include a timetable for resolution of the non-compliance issue(s).

- A. If the Parties determine that a corrective action plan is not required and an incident of non-compliance occurs in the subsequent calendar year, the Parties shall meet to develop a mutually agreeable written corrective action plan by December 31 of the year in which the non-compliance occurred, or as otherwise agreed.
- B. In the event the reason for Customer's non-compliance under Section 5.03 is due to a Customer water main break, fire or meter calibration performed by DWSD, these events will be taken into consideration in determining (1) whether a corrective action plan is warranted and (2) the extent to which, if any, the steps specified in Section 5.04 should apply.

5.06 Minimum Annual Volume. Customer shall purchase from the Board not less than the Minimum Annual Volume of water specified in Exhibit B. If Customer's Annual Volume is less than the Minimum Annual Volume, Customer shall pay to the Board an amount

computed by applying the current rate to the Minimum Annual Volume less any amounts already billed to the Customer by the Board.

- 5.07 Periodic Review. For Customer and System planning purposes and, with regard to the Minimum Annual Volume, enforcement of the provisions of Article 3, a Maximum Flow Rate, Pressure Range, Projected Annual Volume and Minimum Annual Volume shall be established by mutual agreement for the Contract Term. If the Contract Term exceeds two years, a contractually binding Maximum Flow Rate, Pressure Range, Projected Annual Volume and Minimum Annual Volume shall be established by mutual agreement for first two years of the Contract Term. If the Contract Term exceeds two years, not later than the second year of the Contract Term, the Board and Customer shall negotiate a contractually binding Maximum Flow Rate, Pressure Range, Projected Annual Volume and Minimum Annual Volume for the succeeding three years of the Contract Term. If the Contract Term exceeds five years, not later than the fifth year of the Contract Term, and every five years thereafter, the Board and Customer shall negotiate a contractually binding Maximum Flow Rate, Pressure Range, Projected Annual Volume and Minimum Annual Volume for the succeeding five years of the Contract Term. If the Parties do not negotiate new or revised Maximum Flow Rates, Pressure Ranges, Projected Annual Volumes and Minimum Annual Volumes according to the aforementioned schedule, then the figures established for planning purposes (as shown in italicized type in Exhibit B) shall become contractually binding for the then-current three or five year term.
- 5.08 Remedy for Excessive Rate(s) of Flow Causing Pressure Problem(s). Customer acknowledges that Customer's rates of flow may cause and/or contribute to the Board's inability to meet its Pressure Range agreements with Customer and/or the Board's other customers (hereinafter, "Pressure Problem"). The Board may review or monitor Customer's daily rates of flow if a Pressure Problem occurs and the Board's Pressure Range agreement with Customer and/or another customer of the Board is alleged to have been breached. The approximate rate of flow by individual meter location used to establish the Pressure Range and Maximum Flow Rate is specified in Exhibit B. If a Pressure Problem occurs, the Parties shall meet to discuss the reasons for the Pressure Problem and develop and implement a mutually agreeable written corrective action plan within sixty calendar days of the Pressure Problem, or as otherwise agreed. The corrective action plan may require one or both of the following steps:
- A. The Board may require that Customer take all reasonable steps to reduce its consumption to the rate of flow established by the Maximum Flow Rate. Such steps may include water conservation measures, outdoor water use restrictions, water loss studies and remediation, and an internal system operation evaluation. In addition, the Board may require that Customer adjust its rate of flow at individual meters, including the establishment of a not-to-exceed flow rate for individual meters.
 - B. The Parties may meet to negotiate a new Maximum Flow Rate. If so negotiated, Customer shall pay the rate associated with the new Maximum Flow Rate in the subsequent rate year.

If the Parties determine that a corrective action plan is not required and a subsequent Pressure Problem occurs, the Parties shall meet to develop and implement a mutually agreeable written corrective action plan within sixty calendar days of the subsequent Pressure Problem, or as otherwise agreed. Any corrective action plan required under this Section 5.08 shall include a timetable for resolution of the Pressure Problem. In the event the reason for the Pressure Problem is due to a Customer water main break, fire or meter calibration performed by DWSD, these events will be taken into consideration in determining (1) whether a corrective action plan is warranted and (2) the extent to which, if any, the steps specified above in this Section 5.08 should apply.

- 5.09 Board Costs for Corrective Action Plan. If at any time the Board is required under the terms of this Article 5 to develop and implement a corrective action plan and the plan involves incurring capital costs, the Board will determine whether the costs will be charged as a System cost or whether the cost will be borne by a specific customer or customers. If the Board determines that all or part of the costs should be borne by a specific customer or customers, the Board will seek a recommendation from the Technical Advisory Committee on the assessment of the costs.
- 5.10 Customer Costs for Corrective Action Plan. If at any time Customer is required under the terms of this Article 5 to develop and implement a corrective action plan, Customer shall be so informed in writing and Customer will pay all costs related to the corrective action plan.

Article 6. Technical Advisory Committee

- 6.01 Establishment. The Technical Advisory Committee is formed to facilitate a cooperative working partnership between the Board and its wholesale water customers by facilitating the development of recommendations regarding System planning and supply to DWSD management and the Board. The Technical Advisory Committee shall maintain bylaws that govern the way it conducts its business. In the event of a conflict between the terms of the bylaws adopted by the Technical Advisory Committee and the terms of this Contract, the terms of this Contract shall control.
- 6.02 General Responsibilities. The Technical Advisory Committee shall periodically review and evaluate the rates, rate methodology, and performance of the System. The Technical Advisory Committee shall review and evaluate flow rates, pressures and Annual Volumes for the System at a minimum of every five years to assist the Board in its System planning effort. The Technical Advisory Committee shall have the opportunity each year to review the Capital Improvement Program as prepared by DWSD, prior to its adoption by the Board. The Technical Advisory Committee may consider Customer proposals for improving the operation of Customer's water system and/or the System. The Board will supply the Technical Advisory Committee with information the Board deems reasonably necessary to accomplish the general responsibilities defined in this Section 6.02.
- 6.03 Annual Report by Board. The Board will present an annual report to the Technical Advisory Committee which shall consist of (1) all instances of non-compliance with the Parties' obligations contained in Article 5 herein, including Customer and Board responses

thereto; (2) a general report on System operation and maintenance; and (3) a report that lists those contracts, if any, that have been entered into by the Board and another customer(s) where the terms of the contract(s) invoke the application of Article 14 herein.

- 6.04 Notification of Rates. The Board shall provide Customer and the Technical Advisory Committee with notice of the proposed rates for each fiscal year as early as possible before the implementation of the rates.
- 6.05 Disclosure of Rate Information by Board. Each year, the Board will disclose to Customer and the Technical Advisory Committee information related to wholesale rates.
- 6.06 Disclosure of Rate Information by Customer. Each year, Customer will disclose to its customers information related to its retail rates and other charges, and information regarding what portion of those costs is related to charges from DWSD and/or other major service providers.
- 6.07 Work Groups. The Technical Advisory Committee may create work groups to address specific issues facing the System. The work groups in existence as of January 1, 2008 are the Analytical Work Group, the Best Practices Work Group, the Contract Work Group, the Customer Service Work Group, the Emergency Preparedness Work Group, and the Rates Work Group. Any reference to a particular work group in this Contract shall include its successor or replacement if altered or discontinued.

Article 7. Rates

- 7.01 Rates. Customer agrees to pay for all water supplied by the Board at such rates as the Board may establish. Rates shall be reasonable in relation to the costs incurred by the Board for the supply of water and shall conform to Public Act 34 of 1917, Michigan Compiled Laws, Sec. 123.141, et seq., as amended. The Board shall give written notice of any changes in the rates. Notice shall be made in accordance with Section 5e of Public Act 279 of 1909, Michigan Compiled Laws, Sec. 117.5e, as amended, ("Act 279").
- 7.02 Notification of Rates. As soon as possible in the ratemaking process, the Board shall provide information on proposed rates and the draft data and information used in the calculation of proposed rates in a format that will enable Customer to assist in the ratemaking process. Not less than thirty calendar days prior to the hearing required by Act 279, the Board shall provide Customer with written notice of a proposed rate and the underlying data used to calculate the rate. The Board shall meet with Customer to review the rate and the data.
- 7.03 Estimate of Usage. In the event that the Board-owned master meter known as GN-01 fails to correctly measure the quantity of water supplied to Customer for any period of time, the Board shall provide a reasonable estimate of the quantity of water supplied to Customer for such period provided that there is a reasonable basis for the estimate. Customer and the Board shall, either through their respective technical representatives and/or the Technical Advisory Committee, seek agreement upon a method to estimate such quantities. In the event the Parties are unable to agree upon a method to estimate such quantities, the

Board's determination of a method shall be conclusive and the Customer agrees to accept the estimate established by the Board.

- 7.04 Rate Methodology. The Board agrees to provide to Customer a description of the current methodology for rate making in the form of the "Rates 101" document produced by the Technical Advisory Committee, as may be periodically updated. The "Rates 101" document, entitled *DWSD Rates: Understanding DWSD Wholesale Water Rates*, and any updates thereto shall be provided to Customer via posting on the DWSD website.

Article 8. Meters and Meter Facilities

- 8.01 Metering Requirement. All water furnished by the Board to Customer shall be measured by water meters installed in Meter Facilities at Customer's Water Distribution Points unless, in the Board's determination, it is not feasible to install water meters due to the configuration of Customer's water system. Customer's water usage shall be measured by the Board-owned master meter known as GN-01. Because GN-01 also measures the water usage of GCDC, Customer has a separate metering agreement with GCDC (attached as Exhibit C) whereby GCDC will report to Customer and the Board on a monthly basis the volume of water attributable to Customer through the GN-01 master meter. Customer shall ensure that GCDC provides the monthly meter information, specifying the unit of measurement used, on or before the 5th day of each calendar month. Customer shall ensure that the Board has the right at any time to audit the metering information provided by GCDC.
- 8.02 Existing Distribution Points. As of the effective date of this Contract, the Board shall own, operate and maintain all water meters and Meter Facilities for all existing Water Distribution Points, unless specifically indicated otherwise in Exhibit A.
- 8.03 Customer Maintenance Responsibilities. Customer shall be responsible for maintaining at its Water Distribution Points any and all appurtenances as may be designated as Customer's responsibility in Exhibit A. Should Customer fail to maintain the appurtenances shown in Exhibit A, the Board may take reasonable steps to maintain the appurtenances and charge the reasonable cost of doing so to Customer. Prior to the Board taking action to maintain the appurtenances, the Board shall give Customer thirty days written notice to complete the required maintenance. Notice to the Customer shall not be required if, in the Board's determination, there exists an emergency condition affecting the operation of the System or if the health, safety and welfare of the general public may be jeopardized.
- 8.04 New Distribution Points. For any new Water Distribution Points that may be constructed or installed after the effective date of this Contract, Customer shall furnish at Customer's expense, a water meter and Meter Facility that meets the Board's specifications. Thereafter, the Board shall furnish any replacement water meters for new Water Distribution Points and the expense shall be recovered through the Board's rates as a System cost. The Board shall own, operate and maintain all water meters and Meter Facilities after construction, installation or replacement, unless specifically indicated otherwise in Exhibit A.

- 8.05 Meter Repair and Replacement. If the Board initiates a meter repair or meter replacement, the cost shall be recovered through the Board's rates as a System cost. If Customer requests a meter replacement for reasons other than malfunction or disrepair, Customer shall pay the cost of the replacement.
- 8.06 Pressure Regulating Facilities. After the effective date of this Contract, all newly installed Customer-owned pressure regulating facilities shall be installed in a facility that is separate from the Board's Meter Facility.

**Article 9.
Reserved**

**Article 10.
Reserved**

**Article 11.
Force Majeure, Hold Harmless and Other Events**

- 11.01 Force Majeure. No failure or delay in performance of this Contract, by either Party, shall be deemed to be a breach thereof when such failure or delay is caused by a force majeure event including, but not limited to, any Act of God, strikes, lockouts, wars, acts of terrorism, riots, epidemics, explosions, sabotage, breakage or accident to machinery or lines of pipe, the binding order of any court or governmental authority, or any other cause, whether of the kind herein enumerated or otherwise, not within the control of a Party, except that no cause or contingency shall relieve Customer of its obligation to make payment for water delivered by the Board.
- 11.02 Board Held Harmless. Customer is experiencing a public health emergency which has resulted in the necessity of entering into this Contract. The Parties do not know the extent of the claims and/or damages which may result from the emergency, nor if the provision of water services by the Board will abate, improve or otherwise alleviate this emergency. As such, the Board shall not be held liable or accountable for any alleged water source or supply issues, or bursting, leakage, breakage, damage or accident of any kind that may occur to Customer's water works system, or any alleged damages of any kind or nature, including, but not limited to, injury to persons or damage to property, resulting from or alleged to result from such water source or supply issues, or bursting, leakage, breakage, damage or accident that may occur to water mains or pipes located downstream of the Water Distribution Points specified herein, or located within Customer's distribution system. Furthermore, to the extent permitted by law, Customer shall indemnify, defend and hold harmless the City of Detroit and the Great Lakes Water Authority from and against any and all alleged liabilities, obligations, damages, penalties, claims, costs, charges, losses and expenses (including, without limitation, fees and expenses for attorneys, expert witnesses and other consultants) that may be imposed upon, incurred by or asserted against the City of Detroit or the Great Lakes Water Authority and their respective departments, officers, employees or agents by reason of any of the following alleged to be attributable to the provision of water services under the terms of this Contract:

- A. Any and all alleged injury to persons or damage to property; and
 - B. Any alleged failure by Customer or its agents to perform its obligations, either express or implied, under this Contract; and
 - C. Any alleged act, error or omission of Customer or its agents with regard to (i) Customer's distribution of water supplied by the Board downstream of the Water Distribution Point, and (ii) any alteration by Customer or its agents to the water supplied by the Board downstream of the Water Distribution Point, including without limitation any chemical additions to the water as set forth in Section 17.05.
- 11.03 Discontinuance of Service. In the event the public health, safety and welfare requires the Board to discontinue temporarily all or part of the supply of water to Customer, no claims for damages of any kind or nature for such discontinuance shall be made by Customer against the Board. The Board will provide notice to Customer of any temporary discontinuance of the water supply.

Article 12. Timely Payment

- 12.01 Billing and Payment. Bills for water service shall be rendered to Customer on a monthly basis. Notwithstanding the provisions of this Article 12, all such bills shall be due and payable within forty-five calendar days from the date shown on the bill. Any portion of the charges that are not paid by the due date shall be subject to a finance charge at a rate of 1.5% per month for each month that they remain unpaid. Any portion of the total bill, plus any finance charges applied to the bill which are not paid by the next billing date, shall be shown on the next bill as arrears.
- 12.02 Dispute. The Board may disconnect water service in accordance with the terms of this Contract, including without limitation Sections 12.03 and 12.04. The Board shall not terminate water service if there is a good faith dispute concerning the accuracy of billings. If the accuracy of a bill is in dispute, Customer shall have ten (10) business days in which to provide written notice to the Board of its dispute with the bill and shall place the disputed amount in an escrow account pending resolution of the dispute. Accrued interest on the escrow account shall belong to the Party that prevails in the resolution of the dispute.
- 12.03 Estimated Prepayment for Services. Customer shall deposit with the Board as an estimated prepayment for services for the term of this Contract certain funds as follows: (a) on or before October 16, 2015, an amount equal to Two Million and 00/100 Dollars (\$2,000,000.00), and (b) on or before October 19, 2015, an amount equal to Eight Million and 00/100 Dollars (\$8,000,000.00). Collectively, the Ten Million and 00/100 Dollars (\$10,000,000.00) shall be referred to as the "Estimated Prepayment". The Estimated Prepayment will be credited to Customer's suburban billing account with the Board. Each month, the Board shall be entitled to draw down from the Estimated Prepayment a sum equal to the amount of the then-current billing. If at any time the Board determines in its sole and reasonable discretion that the remaining amount of the Estimated Prepayment will be insufficient to cover the next monthly billing and/or the remainder of the Contract Term,

Customer shall be required to replenish within thirty (30) days the estimated prepaid funds in the amount required by the Board provided, however, that the Parties shall endeavor to mutually agree upon the amount. Failure to so replenish the estimated prepaid funds shall permit the Board to terminate services to Customer. At the conclusion of the Contract Term, if Customer is in good standing with the Board and there are funds remaining from the Estimated Prepayment, Customer shall be entitled to the prompt return of all such funds. The Estimated Prepayment made by Customer shall not relieve Customer of its obligation to make payment in full for all water delivered by the Board to Customer.

- 12.04 Account Stated. Notwithstanding the provisions of this Article 12, if Customer fails to make timely payment on invoices due as set forth in this Contract, in addition to terminating services to Customer, the Board shall be entitled to have a judgment entered against Customer for the entire unpaid balance, together with late fees, finance charges, interest, and the costs and reasonable attorney fees required to obtain that judgment. The Board shall be entitled to file this Contract in a court of proper jurisdiction as evidence of Customer's agreement to the existence of the debt stated and Customer's agreement to its liability for that debt.

Article 13. Assignment

- 13.01 The Board shall be permitted to assign this Contract to any successor in interest without the prior consent of Customer. Thereafter, and as soon as practicable, the Board shall provide written notice to Customer of the assignment.

Article 14. Reserved

Article 15. Amendment

- 15.01 The Parties may periodically consider it in their best interests to change, modify or extend a term, condition or covenant of this Contract for reasons which may include, but are not limited to, the creation, expansion or closing of industry or other business. Any change, addition, deletion, extension or modification that is mutually agreed upon by the Board and Customer shall be incorporated in a written amendment to this Contract. Such amendments shall not invalidate this Contract nor relieve or release either Party of any of its respective obligations under this Contract unless so stated in the amendment.
- 15.02 No amendment to this Contract shall be effective and binding upon the Parties unless it expressly makes reference to this Contract, is in writing, is signed and acknowledged by duly authorized representatives of both Parties.

Article 16. Notices

- 16.01 Except as otherwise specified herein, all notices, consents, approvals, requests and other communications (collectively, "Notices") required or permitted under this Contract shall be given in writing and mailed by first class mail to the Parties and at the addresses identified in Exhibit B.
- 16.02 All Notices shall be deemed given on the day of post-marked mailing. Any Notice given by a Party hereunder must be signed by an authorized representative of such Party.
- 16.03 Notwithstanding the requirement above as to the use of first-class mail, change of address notices, termination notices, and other Notices of a legal nature, shall be sent by certified first-class mail, postage prepaid, return receipt requested.

Article 17. Water Quality

- 17.01 Contamination. For the protection of the health of all consumers supplied with water from the System, Customer agrees to guard carefully against all forms of contamination. Should contamination occur, the area or areas affected shall immediately be shut off and isolated, and shall remain so until such conditions shall have been abated, and the water declared safe and fit for human consumption by the properly constituted governmental health agencies having jurisdiction of the area affected. Customer shall immediately notify the Board, and the Board shall immediately notify Customer, of any emergency or condition that may affect the quality of water in either Party's system.
- 17.02 Co-mingling of Water Sources. Except in cases of emergency other than the specific public health emergency addressed by this Contract, Customer will not permit water from any other source of supply to be mixed or mingled with water from the System without prior written approval from the Board. In cases of emergency, only such water from sources other than the Board shall be used as shall meet the requirements of the Michigan Department of Environmental Quality, and then only in such quantities as shall be necessary to relieve the emergency.
- 17.03 Emergency Connections. During emergencies other than the specific public health emergency addressed by this Contract, Customer's water facilities may be used and connected, at the discretion of the Board, to water facilities serving other communities for flow in either direction to provide an adequate water supply from the System to Customer and to other areas and other units of government. Customer shall be permitted to immediately make an emergency connection when the connection point to be used has been previously approved for emergency use by the Board in writing, provided that Customer shall, after making the connection, promptly notify the Board of such event. When the emergency has been abated, the emergency connection must be severed as soon as practicable. The Board, or its designee, must approve, in writing, the continuation of any emergency connection that is required for longer than seven calendar days. If an approved emergency connection continues for more than seven calendar days, Customer must

provide the Board with weekly updates on the emergency and a schedule for abatement of the emergency that must be approved by the Board in writing.

- 17.04 Water Quality. The Board shall endeavor to remain in compliance with all applicable Michigan and Federal laws, rules and regulations regarding drinking water quality.
- 17.05 Chemical Additions, Public Relations. Customer has advised the Board that in order to more effectively address its public health emergency, it may inject additional chemical treatments into the water it receives from the Board. Customer shall prevent the backflow of any water containing additional chemical treatments by Customer from entering into the System and any other water systems utilizing water provided by the System. Customer acknowledges that such additional chemical treatments may result in chemical, biological and/or physical changes to the water provided by the Board. In order that the public be kept fully informed as to the explanation for any chemical, biological and/or physical changes and to ensure that the Board's long established and award winning brand is not diminished in any way, Customer agrees to coordinate with and seek the approval of the Board regarding its public relations communications on these issues.

Article 18. Rights-of-Way

- 18.01 Use of Rights-of-Way. The Customer shall assist the Board to obtain permission to use streets, highways, alleys, and/or easements in the local governmental units within the Customer's jurisdiction for the purpose of constructing, maintaining, and operating water facilities to adequately service the Customer's jurisdiction and other areas. This assistance shall include obtaining the consent of the local governmental units, as provided in Article 7, Section 29, Michigan Constitution of 1963. In the event of such construction, the Board shall request the Customer and local governmental units within the Customer's jurisdiction to execute such separate instruments granting rights-of-way in its streets, highways, and alleys as may be reasonably required by the Board. The Board shall give the Customer notice of any construction work in the Customer's jurisdiction. The Board shall comply with any of Customer's ordinances that apply to the construction. Customer shall inform the Board of the applicable ordinances. The Board and Customer shall meet to review the construction and its impact on their respective operations. The Board shall restore all existing structures and/or improvements laying in the right-of-way of construction to as good a condition as before the construction took place. Any such facilities constructed, maintained and operated under this section shall remain the property of the Board and shall not be operated or maintained by any entity other than the Board or its authorized representatives.
- 18.02 Relocation of Facilities. Should future construction by any city, township, village, or county require relocation of a water transmission main, Meter Facility or other Board facility, the cost incurred by the Board for such relocation, if not reimbursed by the entity requiring the relocation, will be charged in future rates as a common-to-all cost to all System users.
- 18.03 Easements. Subject to the provisions of Section 18.01 herein and to the extent that Customer has jurisdiction, the Board shall be granted temporary and permanent easements,

and shall be permitted to use the streets, alleys and highways within Customer's legal jurisdiction for the purpose of constructing, operating and maintaining the System, including the relocation of water transmission mains, Meter Facilities or other Board facilities. This consent by Customer is given in compliance with Article 7, Sec. 29 of the Michigan Constitution of 1963, provided that the Board shall provide Customer with a written explanation of the type of easement required and the duration thereof.

Article 19.

Access to Towers and Antennas

- 19.01 Where possible, each Party shall give to the other Party access to towers and antennas under its respective jurisdiction for the purpose of transmitting information recorded in the Meter Facilities. Access shall not be unreasonably denied by either Party.

Article 20.

Relationship to Wastewater Services

- 20.01 Customer and the Board acknowledge that future growth in the System may place additional burdens on their respective wastewater systems. Customer, if it is also a wastewater disposal services customer of the Board, understands that any increase in the volume of water it receives from the System is not a guarantee of increased capacity in the Board's wastewater disposal system.

Article 21.

Construction Standards

- 21.01 The Board shall have the right to review and approve Customer's construction plans for Meter Facilities at new Water Distribution Points, water mains sized twenty-four inches and larger, pump stations, reservoirs, water towers, and any other construction that will cross, or be within close proximity to, or have influence upon the Board's infrastructure. The Board's approval of construction plans shall be timely and shall not be unreasonably withheld.

Article 22.

Operation of Storage

- 22.01 Prior to Customer's operation of any new or existing water storage facility, Customer shall seek the Board's written approval of the filling schedule ("Filling Schedule") of the storage facility. The Board may periodically require Customer to change or adjust a previously approved Filling Schedule. The Parties shall collaborate on devising a mutually beneficial Filling Schedule. If the Parties are unable to agree upon a Filling Schedule, the Board's determination of a Filling Schedule shall be final. All Filling Schedules shall be for a period of six consecutive hours. Customer shall at all times abide by the then-current Board approved Filling Schedule. The Board shall act promptly in approving Filling Schedule requests. Nothing in this Article 22 shall prevent Customer from operating its storage facility at any time, provided that any storage operation that falls outside of the approved Filling Schedule shall not be exempt from the terms of Article 5 herein.

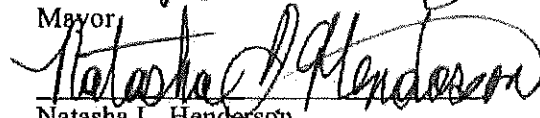
Article 23.
Miscellaneous

- 23.01 If any provision of this Contract or its application to any person or circumstance shall to any extent be invalid or unenforceable, the remainder of this Contract shall not be affected and shall remain valid and enforceable to the fullest extent permitted by law.
- 23.02 This Contract contains the entire agreement between the Parties and all prior negotiations and agreements are merged into this Contract. Neither Party has made any representations except those expressly set forth in this Contract, and no rights or remedies are, or shall be, acquired by either Party by implication or otherwise unless expressly set forth in this Contract.
- 23.03 Unless the context otherwise expressly requires, the words "herein," "hereof," and "hereunder," and other words of similar import, refer to this Contract as a whole and not to any particular section or subdivision.
- 23.04 The headings of the sections of this Contract are for convenience only and shall not be used to construe or interpret the scope or intent of this Contract or in any way affect the same.
- 23.05 The rights and remedies set forth in this Contract are not exclusive and are in addition to any of the rights or remedies provided by law or equity. This Contract and all actions arising under it shall be governed by, subject to, and construed according to the law of the State of Michigan.
- 23.06 The Great Lakes Water Authority is an acknowledged third party beneficiary to this Contract and this Contract shall not be construed to benefit any persons other than the Board, the Great Lakes Water Authority and Customer.
- 23.07 This Contract may be executed in any number of originals, any one of which shall be deemed an accurate representation of this Contract. Promptly after the execution of this Contract, the Board shall provide a copy to the Customer.
- 23.08 The rights and benefits under this Contract shall inure to the benefit of and be binding upon the respective Parties hereto, their agents, successors, and assigns.
- 23.09 Any and all documents, memoranda, reports, exhibits or other written material referred to in this Contract are and shall be incorporated by reference herein.
- 23.10 This Contract shall be deemed to be mutually drafted.

(Signatures appear on next page)

In Witness Whereof, the City and Customer, by and through their duly authorized officers and representatives, have executed this Contract.

City of Flint:

By: 
Dayne Walling
Its: Mayor
By: 
Natasha L. Henderson
Its: City Administrator

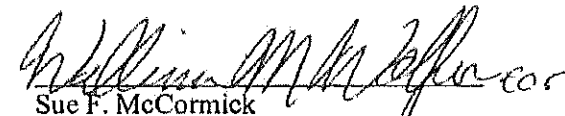
APPROVED BY
FLINT CITY COUNCIL ON:

AUTHORITY GRANTED 10/12/2015
Date

APPROVED AS TO FORM BY
FLINT CITY ATTORNEY ON:

 10/16/15
Signature Date

City of Detroit:

By: 
Sue F. McCormick
Its: Director, Water and Sewerage Department

APPROVED BY DETROIT
BOARD OF WATER COMMISSIONERS ON:

10-14-15
Date

APPROVED AS TO FORM BY
DWSD GENERAL COUNSEL ON:

 10.16.15
Signature Date

EXHIBIT A**Customer's Water Distribution Points**

This Exhibit contains the following information:

1. The corporate limits of Customer;
2. The agreed upon water Service Area of Customer which (a) may or may not be entirely within the corporate limits of Customer and (b) which may or may not include the entire area within the Customer's corporate limits;
3. The specific location of the Water Distribution Points, including any Board approved emergency connections;
4. The designation of appurtenances to be maintained by Customer and those to be maintained by the Board; and
5. A list of any closed meter locations.

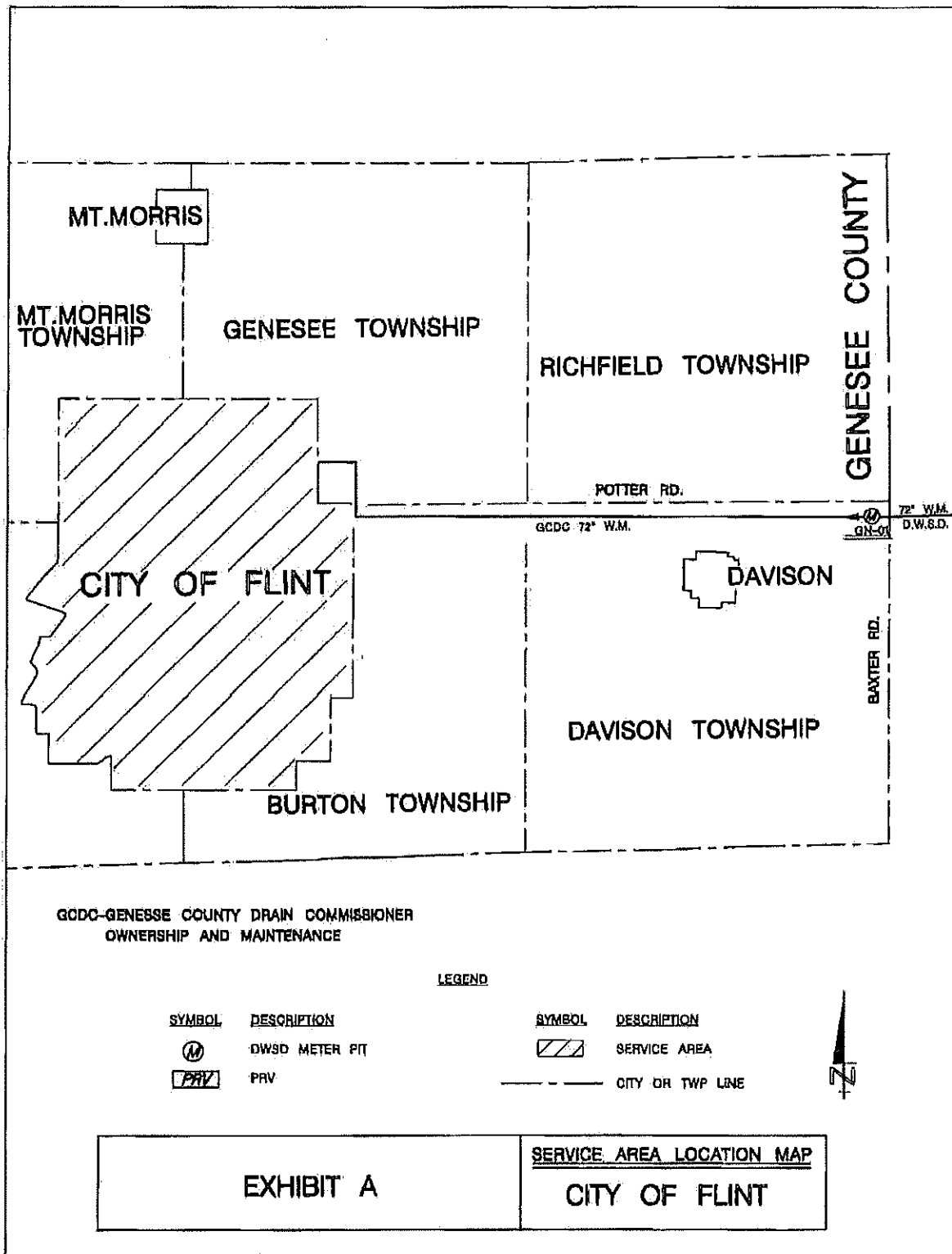


EXHIBIT A**City of Flint Emergency Connections:****City of Flint Water Customers Outside Municipal Limits:**

3148	Augusta St	2509	Flushing Rd
3149	Augusta St	3037	Flushing Rd
1274	N Ballenger Hwy	3039	Flushing Rd
3180	Branch Rd	3047	Flushing Rd
3186	Branch Rd	3061	Flushing Rd
3376	Branch Rd	2122	E Hemphill Rd
3418	Branch Rd	2130	E Hemphill Rd
3450	Branch Rd	2278	E Hemphill Rd
3492	Branch Rd	2288	E Hemphill Rd
2296	W Carpenter Rd	2306	E Hemphill Rd
2340	W Carpenter Rd	2350	E Hemphill Rd
2432	W Carpenter Rd	2414	E Hemphill Rd
2474	W Carpenter Rd	1047	W Hemphill Rd
3014	N Center Rd	3141	Herrick St
3022	N Center Rd	3308	Hull Ave
3030	N Center Rd	3314	Hull Ave
3062	N Center Rd	3319	Hull Ave
3070	N Center Rd	3320	Hull Ave
3080	N Center Rd 1	3342	Hull Ave
3080	N Center Rd 2	3351	Hull Ave
3094	N Center Rd	3272	Menominee Ave
3098	N Center Rd	3276	Menominee Ave
3100	N Center Rd	3281	Menominee Ave
3102	N Center Rd	3289	Menominee Ave
3106	N Center Rd	3295	Menominee Ave
3112	N Center Rd	3299	Menominee Ave
3268	Cheyenne Ave	3300	Menominee Ave
3275	Cheyenne Ave	3303	Menominee Ave
3280	Cheyenne Ave	3304	Menominee Ave
3281	Cheyenne Ave	3309	Menominee Ave
3285	Cheyenne Ave	3312	Menominee Ave
3290	Cheyenne Ave	3313	Menominee Ave
3295	Cheyenne Ave	3316	Menominee Ave
3298	Cheyenne Ave	3317	Menominee Ave
3299	Cheyenne Ave	3326	Menominee Ave
3302	Cheyenne Ave	3330	Menominee Ave
3307	Cheyenne Ave	3335	Menominee Ave

3308	Cheyenne Ave	3343	Menominee Ave
3311	Cheyenne Ave	3344	Menominee Ave
3312	Cheyenne Ave	3348	Menominee Ave
3325	Cheyenne Ave	3349	Menominee Ave
3334	Cheyenne Ave	2036	Nedra
3338	Cheyenne Ave	2052	Nedra
3339	Cheyenne Ave	2058	Nedra
3340	Cheyenne Ave	2070	Nedra
3347	Cheyenne Ave	2100	Nedra
3272	Cheyenne Ave	2126	Nedra
4113	Clio Rd	3024	W Pierson Rd
4243	Clio Rd	2178	Red Arrow Rd
3176	W Court St	3157	Richfield Rd
3189	W Court St	3175	Richfield Rd
4028	W Court St	3217	Richfield Rd
1026	Decamp	1046	Ronlad St
3009	S Dort Hwy	1066	Ronlad St
3043	S Dort Hwy	1069	Ronlad St
3111	S Dort Hwy	3275	Van Slyke Rd
3281	S Dort Hwy	3339	Van Slyke Rd
3342	Fenton Rd	3150	Whitney Ave
		3155	Whitney Ave

City of Flint Master Meters Not In Service:

None.

EXHIBIT-A
GN-01
POTTER AND BAXTER
CITY OF FLINT

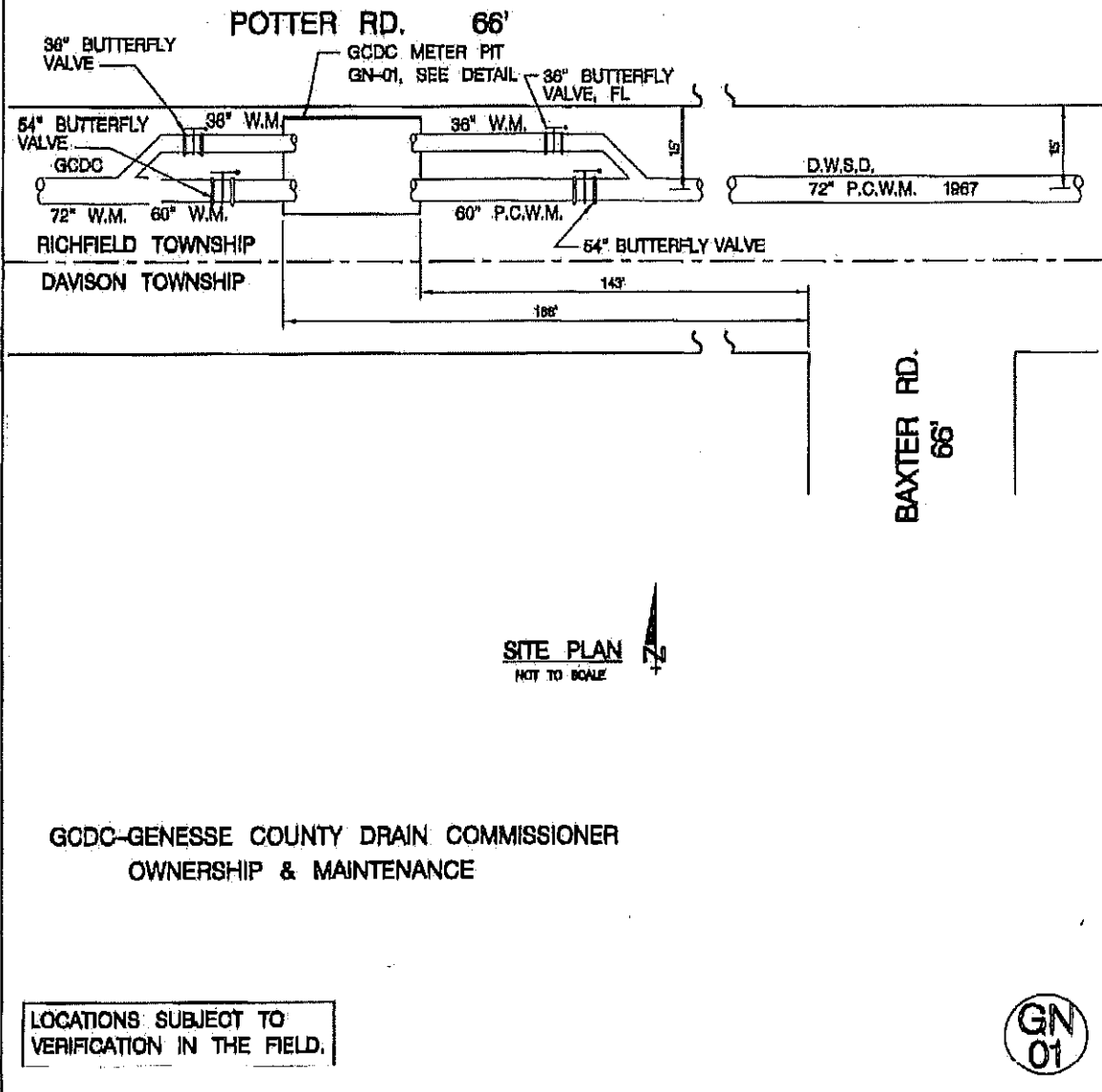
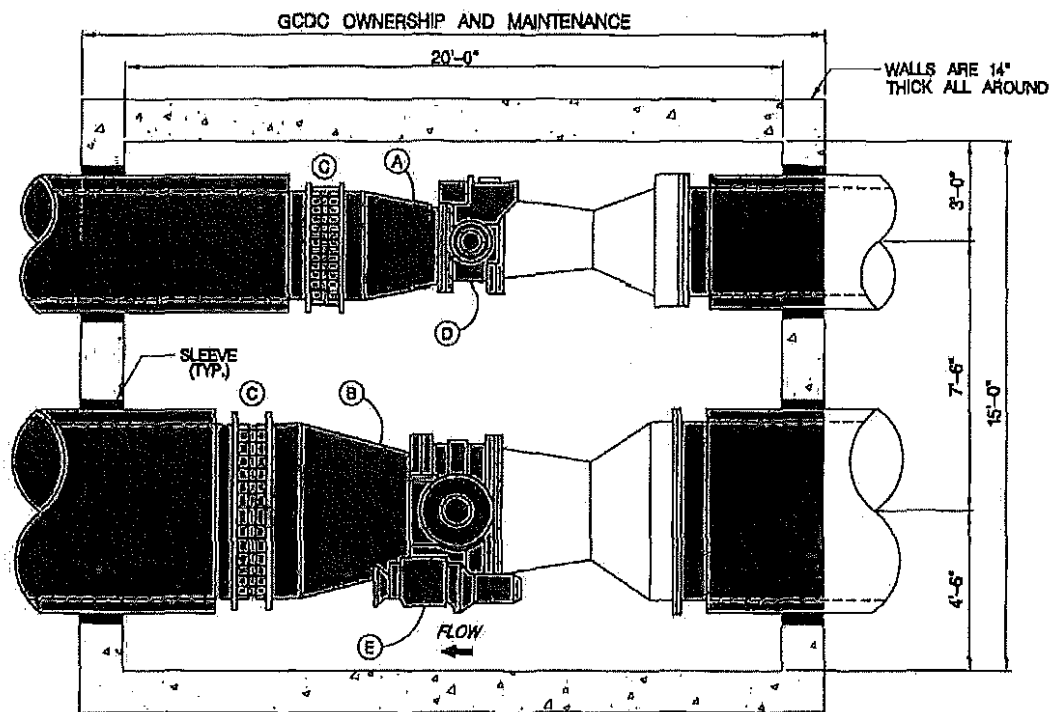


EXHIBIT-A
GN-01
POTTER AND BAXTER
CITY OF FLINT



METER PIT DETAIL

NOT TO SCALE

GENESEE COUNTY DRAIN COMMISSIONER (GCDC)
OWNERSHIP & MAINTENANCE

LEGEND		
TAG	QTY	DESCRIPTION
A	1	PENN. FLOW TUBE
B	1	PENN. FLOW TUBE
C	2	COUPLING
D	1	MOTOR OPERATED BUTTERFLY VALVE
E	1	MOTOR OPERATED BUTTERFLY VALVE

TYPICAL PRESSURE LOSS THRU METER	
METER TYPE	P.S.I. LOSS
VENTURI	1 - 2
MAG	0
TURBINE	4 - 6

- (P) UPSTREAM PRESSURE TRANSMITTER, DWSD OWNERSHIP AND MAINTENANCE LOCATION OUTSIDE VAULT
- (Q) DOWNSTREAM PRESSURE TRANSMITTER, DWSD OWNERSHIP AND MAINTENANCE LOCATION OUTSIDE VAULT

ADDRESS _____ 12281 POTTER
 FEED TO _____ CITY OF FLINT AND GCDC
 FEED FROM _____ D.W.S.D. TRANS. MAIN
 TYPE OF METER _____ TWO - PENN FLOW TUBES
 SIZE OF METER _____ 60" X 37.408 "X 42' 36" X 22" X 30"
 TUBE NUMBER _____ 80"828141 36"828142
 DATE METER SET _____ DECEMBER 14, 1967
 METER PIT CONST. & SIZE _____ 20'-0" X 15'-0" I.D. REINF. CONC
 REMARKS _____ MANUAL SWITCHOVER

GN
01

EXHIBIT B

**Projected Annual Volume and Minimum Annual Volume (Table 1)
Pressure Range and Maximum Flow Rate (Table 2)
Flow Split Assumptions (Table 3)
Addresses for Notice (Table 4)**

Table 1 and Table 2 set forth the agreed upon Projected Annual Volumes, Minimum Annual Volumes, Pressure Ranges and Maximum Flow Rates for the term of this Contract provided that figures in bold type face are immediately enforceable pursuant to the terms of Section 5.07 and italicized figures are contained for planning purposes only but will become effective absent the negotiated replacements anticipated in Section 5.07.

The approximate rate of flow by individual meter set forth in Table 3 is the assumption upon which the Pressure Range commitments established in Table 2 have been devised. Should Customer deviate from these assumptions at any meter(s), the Board may be unable to meet the stated Pressure Range commitments in this Contract or in the contract of another customer of the Board and Section 5.08 of this Contract may be invoked.

EXHIBIT B

Table 1
Projected Annual Volume and Minimum Annual Volume

Fiscal Year Ending June 30	Projected Annual Volume (Mcf)	Minimum Annual Volume (Mcf)
2016	593,000	296,500
2017	593,000	296,500
2018	TBD	TBD
2019	TBD	TBD
2020	TBD	TBD
2021	TBD	TBD
2022	TBD	TBD
2023	TBD	TBD
2024	TBD	TBD
2025	TBD	TBD
2026	TBD	TBD
2027	TBD	TBD
2028	TBD	TBD
2029	TBD	TBD
2030	TBD	TBD
2031	TBD	TBD
2032	TBD	TBD
2033	TBD	TBD
2034	TBD	TBD
2035	TBD	TBD
2036	TBD	TBD
2037	TBD	TBD
2038	TBD	TBD
2039	TBD	TBD
2040	TBD	TBD
2041	TBD	TBD
2042	TBD	TBD
2043	TBD	TBD
2044	TBD	TBD
2045	TBD	TBD

EXHIBIT B

Table 2
Pressure Range and Maximum Flow Rate

Calendar Year	Pressure Range (psi)		Maximum Flow Rate (mgd)	
	Meter GN-01		Max Day	Peak Hour
	Min	Max		
2015	40	60	21.40	22.40
2016	40	60	21.40	22.40
2017	40	60	TBD	TBD
2018	40	60	TBD	TBD
2019	40	60	TBD	TBD
2020	40	60	TBD	TBD
2021	40	60	TBD	TBD
2022	40	60	TBD	TBD
2023	40	60	TBD	TBD
2024	40	60	TBD	TBD
2025	40	60	TBD	TBD
2026	40	60	TBD	TBD
2027	40	60	TBD	TBD
2028	40	60	TBD	TBD
2029	40	60	TBD	TBD
2030	40	60	TBD	TBD
2031	40	60	TBD	TBD
2032	40	60	TBD	TBD
2033	40	60	TBD	TBD
2034	40	60	TBD	TBD
2035	40	60	TBD	TBD
2036	40	60	TBD	TBD
2037	40	60	TBD	TBD
2038	40	60	TBD	TBD
2039	40	60	TBD	TBD
2040	40	60	TBD	TBD
2041	40	60	TBD	TBD
2042	40	60	TBD	TBD
2043	40	60	TBD	TBD
2044	40	60	TBD	TBD

EXHIBIT B

Table 3
Flow Split Assumptions

Meter	Assumed Flow Split (2015-2016)
GN-01	100%

Table 4
Addresses for Notice

If to the Board:	If to Customer:
Director Detroit Water and Sewerage Department 735 Randolph Street Detroit, Michigan 48226 Attention: General Counsel	Mayor City of Flint 1101 S. Saginaw Street Flint, Michigan, 48502 Attention: City Attorney

EXHIBIT C

Metering Agreement Between City of Flint and Genesee County Drain Commissioner

LICENSE TO TRANSMIT WATER

This License to Transmit Water ("License") entered into on October 14, 2015; (the "License Date" and "Effective Date") is made between the City of Flint, a Home Rule City (the "City"), and the Genesee County Drain Commissioner, as County Agency, a county agency pursuant to the County Public Improvement Act 342 of 1939, as amended, ("GCDC"). The City and GCDC may be referred to individually as a "Party" or collectively as the "Parties."

RECITALS

WHEREAS, the City has requested the Detroit Water and Sewerage Department ("DWSD") to provide the City with potable water; and

WHEREAS, DWSD water distribution system has no physical connection to the City water distribution system; and

WHEREAS, GCDC is currently purchasing potable water from DWSD and GCDC is receiving DWSD water at the water meter GN-01 near Baxter and Potter Roads, located in Genesee County and more fully set forth in Exhibit 1 (hereinafter known as "GCDC/DWSD Connection"); and

WHEREAS, GCDC has a physical connection to the City water distribution system near Center Road and Pierson Road in Genesee Township, Genesee County, Michigan, which is more fully set forth in Exhibit 2 (hereinafter known as "GCDC/City Connection"); and

WHEREAS, GCDC owns nine (9) miles of water transmission pipeline ("Pipeline") that connects the GCDC/DWSD Connection to the GCDC/City Connection; and

WHEREAS, GCDC has the ability to allow Flint to transmit water through the Pipeline from the GCDC/DWSD Connection to the GCDC/City Connection so DWSD may service the City with DWSD treated potable water; and

WHEREAS, this License shall govern the terms and conditions of Flint transmitting water through the Pipeline from the DWSD/GCDC Connection to the GCDC/City Connection; and

WHEREAS, the Parties hereto acknowledge and agree that DWSD may assign its contract to provide potable water to the City to another entity, including, but not limited to, the Great Lakes Water Authority, and, if DWSD assigns its contract to provide water to the City, all reference to DWSD in this License shall be replaced by the party to whom DWSD assigns its contract.

NOW, THEREFORE, THIS LICENSE is hereby made and mutually entered into by the City and GCDC for the mutual consideration stated herein and the Parties agree to the following:

1. Adoption of Recitals. All of the matters stated in the Recitals of this License are true and correct and are hereby incorporated into the body of this License as though fully set forth in their entirety herein. However, in cases of conflict, provisions of this License shall prevail over the matters stated in the Recitals.

2. **Contract for Water.** As a condition precedent to this License being effective, the City shall enter into a contract with DWSD for DWSD to supply the City with water and said contract shall require the City to pay DWSD directly for all water consumed by the City and any applicable charges, fees, or other amounts charged by DWSD. The City shall hold GCDC harmless from any and all debts the City incurs from receiving water from DWSD and any and all costs that DWSD may impose on GCDC as a result of the City receiving water from DWSD.

3. **Term.** The Parties hereto understand and acknowledge that GCDC needs the Pipeline to transmit its potable water to its customers once GCDC starts receiving raw water from KWA. The Parties agree and acknowledge that this License shall expire sixty (60) days after the City has received notice from KWA that raw water is available for the City for treatment; however, the City may request GCDC to extend this License until GCDC starts receiving raw water from KWA. The City shall not transmit water through the Pipeline after GCDC begins to transmit its potable water to its customers. The City acknowledges and consents to GCDC terminating any water transmission in the Pipeline for the benefit of the City once GCDC begins to produce and sell its potable water to its customers. The City may terminate this License by providing GCDC with thirty (30) days written notice of termination.

4. **Consideration.** In exchange for GCDC allowing the City to transmit water through the Pipeline, the City shall pay GCDC one dollar (\$1.00) per month for the term of this License. The City is allowed to pay the first nine (9) months in a lump sum payment.

5. **Meters and Billing.** The City hereby grants GCDC complete access to and upon verbal request by GCDC complete control of Station 2, including, but not limited to, all meters, valves, structures, and appurtenances until the Karegnondi Water Authority ("KWA") has notified the City that water is available to the City for treatment or GCDC has provided the City with thirty (30) days notice that GCDC no longer requires access to Station 2. GCDC shall have the meter calibrated within fifteen (15) days of the execution of this License and all costs for the calibration shall be the responsibility of the City. The City shall be entitled to all data, meter reads, and other information that is collected by GCDC at Station 2. The City shall be responsible for all utility costs associated with the operation of Station 2. The City shall be responsible for all repairs to the meter and meter pit. GCDC shall notify DWSD of the monthly meter read for Station 2.

6. **Transmission of Water.** GCDC shall use reasonable diligence to allow the City regular and uninterrupted transmission of water through the Pipeline from the GCDC/DWSD Connection to the GCDC/City Connection; however, Flint shall hold harmless and indemnify GCDC for any damages, breach of contract, or otherwise for interruption of service or curtailment of supply for any cause beyond the control of GCDC. These could include, but are not limited to, Acts of God, strikes, lockouts or other industrial disturbances, acts of public enemy, orders of any kind of the Government of the United States or the State, or any civil or military authority, insurrection, riots, epidemics, landslides, lightning, earthquake, fires, hurricanes, storms, floods, washouts, droughts, arrests, restraint of government and people, civil disturbances, explosions, breakage or accidents to machinery, pipelines or canals, partial or failure of the Pipeline or appurtenances. The City shall further hold GCDC harmless from any claim for damages related to continuity of service by third parties, including DWSD, for GCDC's inability to allow the transmission of water due to any cause beyond the control of GCDC.

7. **Water Quality.** The City shall hold GCDC harmless from any water quality related claim for damages by third parties, including DWSD, served by the City, which are asserted against, or are imposed upon or incurred by GCDC and which result from, relate to, or arise out of a claim regarding the treatment of water or the quality of water.

8. **Volume Available.** The City shall hold GCDC harmless in the event that DWSD cannot meet the volume demands of both GCDC and the City. GCDC shall be entitled to receive the quantity of water requested by GCDC and the City shall be entitled to any remaining volume of water. The City shall notify GCDC daily of its anticipated water volume for that day and GCDC shall be responsible for notifying DWSD of the water volume demands for both GCDC and the City.

9. **Pipeline Malfunction.** If the Pipeline shall malfunction for any reason while the City is transmitting water through the Pipeline, GCDC shall notify the City within two (2) hours of verifying the Pipeline malfunction. Thereafter, the malfunction shall be promptly repaired by GCDC and a detailed invoice for one-half (1/2) of the total cost of the repair shall be submitted to the City. The City shall have thirty (30) calendar days to process and authorize the payment for the repair to GCDC. Payment shall be made to GCDC within thirty-two (32) calendar days by either check or wire transfer. Wire transfer instructions are available from the GCDC Chief Financial Officer. The City shall indemnify and hold GCDC harmless for any and all claims from the City or third parties that relate to the City not being able to supply water to its customers due to the malfunction.

10. **Severability.** The Parties hereto specifically agree that in case any one or more of the sections, subsections, provisions, clauses or words of this License or the application of such sections, subsections, provisions, clauses or words to any situation or circumstance should be, or should be held to be, for any reason, invalid or unconstitutional, under the laws or constitutions of the State or the United States of America, or in contravention of any such laws or constitutions, such invalidity, unconstitutionality or contravention shall not affect any other sections, subsections, provisions, clauses or words of this License or the application of such sections, subsections, provisions, clauses or words to any other situation or circumstance, and it is intended that this License shall be severable and shall be construed and applied as if any such invalid or unconstitutional section, subsection, provision, clause or word had not been included herein, and the rights and obligations of the Parties hereto shall be construed and remain in force accordingly.

11. **Governing Law and Venue.** It is specifically agreed among the Parties to this License that Genesee County, State of Michigan is the place of performance of this License. In the event that any legal proceeding is brought to enforce this License or any provision hereof, the same shall be brought in the Genesee County Circuit Court.

12. **Interpretation and Construction.** For purposes of interpretation and construction of this License, both the City and GCDC shall be deemed to have been the drafter of this License and this License shall not be construed against any Party to this License.

13. **Modification.** This License shall not be modified, altered, or amended except through a written amendment signed by the Parties.

14. **No Third Party Beneficiaries.** This License is not intended to confer upon any person or entity, other than the Parties hereto, any rights or remedies of any kind or nature whatsoever.

15. **Notices.** Other than invoices and payments, any notice, communication, request, reply or advice (herein severally and collectively, for convenience, called "Notice") herein provided or permitted to be given, made or accepted by any Party to any other Party must be in writing and may be given or be served by depositing the same in the United States mail postpaid and registered or certified and addressed to the Party to be notified, with return receipt requested, or by delivering the same to an officer of such Party, or by prepaid telegram when appropriate, addressed to the Party to be notified. Notice deposited in the mail in the manner described above shall be conclusively deemed to be effective, unless otherwise stated herein, from and after the expiration of three (3) days after it is so deposited. Notice given in any other manner shall be effective only if and when received by the Party to be notified. For the purposes of notice, the addresses of the Parties shall, until changed as hereinafter provided, be as follows:

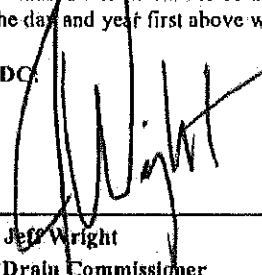
To GCDC: Genesee County Drain Commissioner's Office, Division of Water and Waste Services, G-4610 Beecher Road, Flint, Michigan 48532.

To the City: City of Flint, 1101 South Saginaw Street, Flint, Michigan 48502.

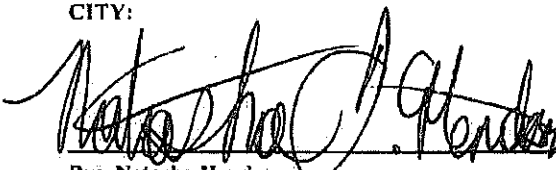
The Parties hereto shall have the right from time to time and at any time to change their respective addresses and each shall have the right to specify as its address any other address by at least fifteen (15) days written notice to the other Party hereto.

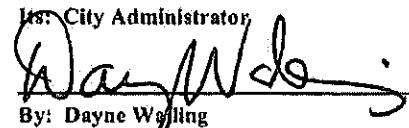
IN WITNESS WHEREOF, the Parties hereto acting under authority of their respective governing bodies have caused this License to be duly executed in several counterparts, each of which shall constitute an original, all as of the day and year first above written, which is the License and Effective Date.

GCDC:

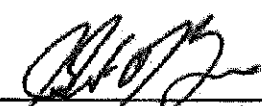
By: 
Its: Drain Commissioner

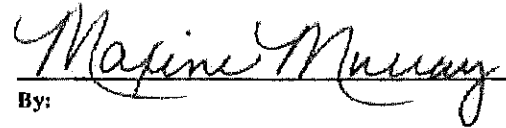
CITY:

By: 
Its: City Administrator

By: 
Its: Mayor

Attest:

By: 

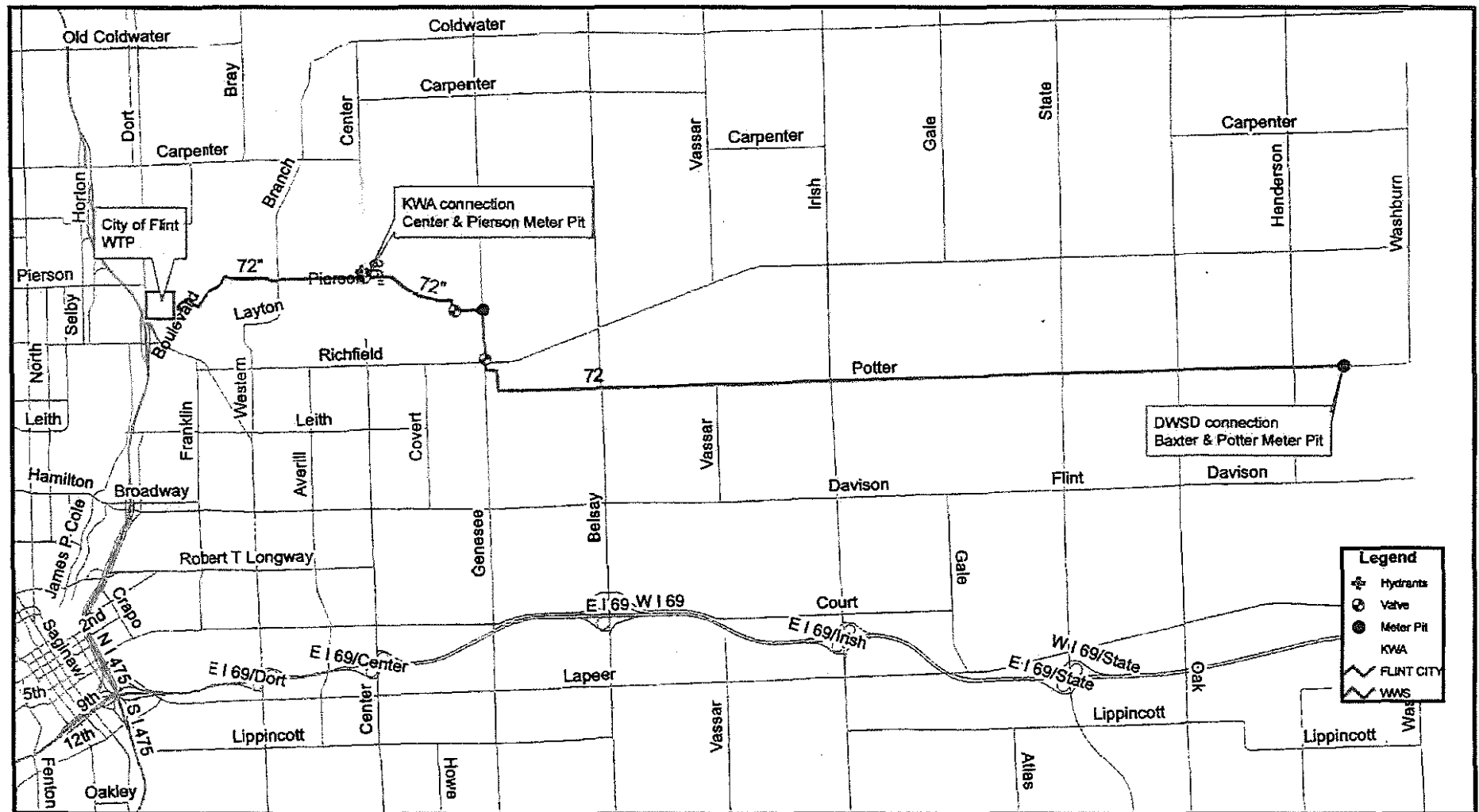
By: 

This License was prepared by:
Attorney Kevin Kilby (P68599)
McGraw Morris P.C.
2075 West Big Beaver Road
Suite 750
Troy, Michigan 48064
Phone: (248) 502-4000
Facsimile: (248) 502-4001
Email: kkilby@mcgrawmorris.com

Approved as to form by:


Peter M. Bade (P47546)
Chief Legal Officer
City of Flint
1101 South Saginaw Street, Room 307
Flint Michigan 48502

Exhibit I
Location of GCDC/DWSD Connection

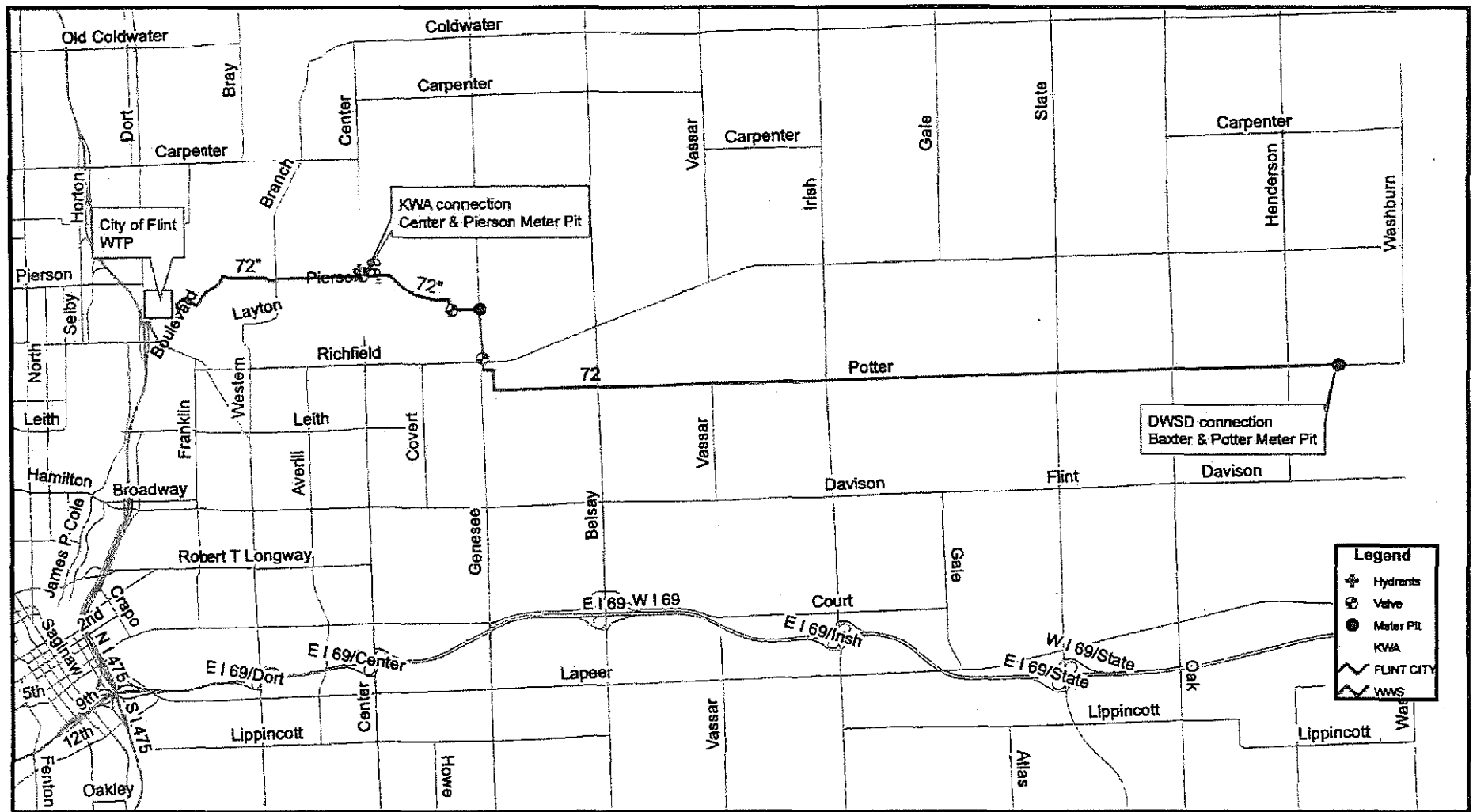


1 inch = 5,000 feet



10/15/2015

Exhibit 2
Location of GCDC/Flint



1 inch = 5,000 feet

10/15/2015