Woosley, Rosemary (DEQ)

6797-15
RMD
Lansing
SEMDD
Grand Rapids
DUE: 10-5-15

From: Katrinell M. Davis <kdavis1@uvm.edu>
Sent: Friday, September 25, 2015 11:01 PM
To: DEQFOIA
Cc: Katrinell Davis
Subject: FOIA Request

Dr. Katrinell M. Davis
13 Mountain View Blvd.
South Burlington, VT 05403
kdavis1@uvm.edu
510-967-4531

DEQ FOIA Coordinator
P.O. Box 30457
Lansing, Michigan 48909-7957
DEQFOIA@michigan.gov

September 25, 2015

Dear DEQ FOIA Coordinator:

Under provisions of the Michigan Freedom of Information Act, 1976 PA 442(MCL 15.231 et seq.), I am requesting a copy of the following documents/data:

1. Data from Annual Reports on Public Water System Violations:
    a. Section 1414(c)(3) of the SDWA requires states to provide the U.S. EPA with an annual report of violations of the primary drinking water standards. I am requesting disaggregated data (city level) from the *Annual Reports on Public Water System Violations* for Grand Blanc Township and Genesee, Wayne, Oakland, Livingston, Macomb and Kent counties. Years 2005-current (2015 or 2014).
2. Consumer Confidence Reports for the City of Flint, Michigan 2010-2013; 2015
3. Copy of drinking water complaints made by citizens and business owners in Flint, Michigan between 2010-current (September 24, 2015).
4. Copy of inspection reports of all water treatment facilities in Genesee County between 2008-2015. Memos from the US Environmental Protection Agency (EPA) regarding water quality concerns in Flint, Michigan, 2013-present

If you determine that some of the requested information is exempt from disclosure, please detail what is being withheld and cite the exemption under FOIA.

If fees to comply with this request exceed $10, please contact me at 510-967-4531.

As provided under FOIA, I anticipate a prompt response to my request. If there are any questions or concerns regarding this request, please be sure to contact me.

Best,
Katrinell M. Davis

Katrinell M. Davis, Ph.D.
Assistant Professor
Department of Sociology
University of Vermont (USA)
Burlington, Vermont 05405-0176
kdavis1@uvm.edu
(802)-656-2168

Shaler, Karen (DEQ)

From: Rennaker, Joanne (DEQ)
Sent: Thursday, October 29, 2015 10:55 AM
To: Shaler, Karen (DEQ)
Subject: FW: FOIA 6797-15 - City of Flint

From: Rennaker, Joanne (DEQ)
Sent: Wednesday, September 30, 2015 9:09 AM
To: 'kdavis1@uvm.edu'
Subject: FOIA 6797-15 - City of Flint

Ms. Davis,

Per our conversation this morning, I am forwarding the link to the information you requested in Item 1 of the FOIA listed above. I will wait for you to contact me with the revision to Item # 4.

http://www.michigan.gov/deq/0,4561,7-135-3313_3675_3691-62960--,00.html

Jo Anne Rennaker
Secretary
Office of Waste Management and Radiological Protection
Office of Drinking Water and Municipal Assistance
517-284-6643

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name:	City of Flint	County:	Genesee	WSSN:	2310
Population:	☐ 500 or fewer people	☐ 501 – 9,999 people	☒ 10,000 or more people		

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). **Return the certification to the appropriate DEQ district office by October 1.** For addresses, visit www.michigan.gov/deq, click on Locations.

Method of delivery to DEQ

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: September 8, 2015

Method of delivery to Local Health Department

☐ Mail ☐ Email ☒ Hand Delivery ☐ Other _____ Date delivered: July 20, 2015

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

☒ Mail or hand deliver a paper copy of CCR. Date(s) mailed or hand delivered: July 17, 2015
☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: _____
☐ Email notification that CCR is available at direct URL: Date(s) emailed: _____
☐ Email notification that CCR is attached to the email. Date(s) emailed: _____
☐ Email notification that CCR is embedded in the email. Date(s) emailed: _____

If using notification of CCR availability:

1. Mail a paper CCR to customers who request it and to customers known to be incapable of receiving electronically.
2. Include a copy of the notification to the DEQ district office with this certification form.
3. Explain the nature of the notification, prominently display the direct URL, include statement how to request a paper copy.

> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
> Message: Your annual report on the source and quality of your drinking water is available on the Web at **www.anytown.gov/waterqualityreport**. To have a copy mailed to you, contact Anytown at 555-111-1111 or water@anytown.gov.

☐ **Option for supplies serving fewer than 10,000 persons:** Publish entire report in newspaper, and notify customers via newspaper(s) in which CCR published, mail, email or hand delivery that individual copies will not be mailed, and include statement how to request a paper copy.
Date(s) of publication: _____

☐ **Option for supplies serving 500 or fewer persons:** Notify customers via mail, email, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply on request.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: https://www.cityofflint.com/wp-content/uploads/CCR-2014.pdf
Date accessible: July 1, 2015

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: _____
☒ Mail to each service connection physical address. Date(s) mailed: July 17, 2015
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☐ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☐ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☐ Deliver the report to community organizations.
☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

A Tier 3 Public Notice Is Distributed with this CCR

☒ This CCR is being used to deliver a Tier 3 Public Notice for one or more violations. To use this Tier 3 delivery option, the CCR must be directly delivered to each bill paying customer or, with DEQ approval, continuously posted, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent Wright Supervisor

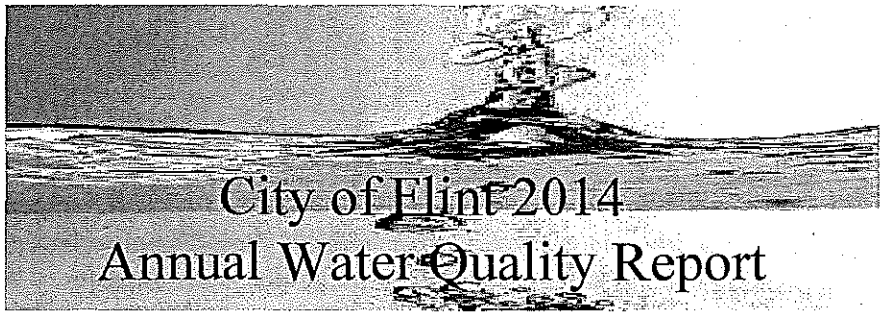
Signature: _____ Date: September 8, 2015

See reverse side for U.S. EPA Expectations for Electronic Delivery of CCR

231C

Flint River

ENTERED

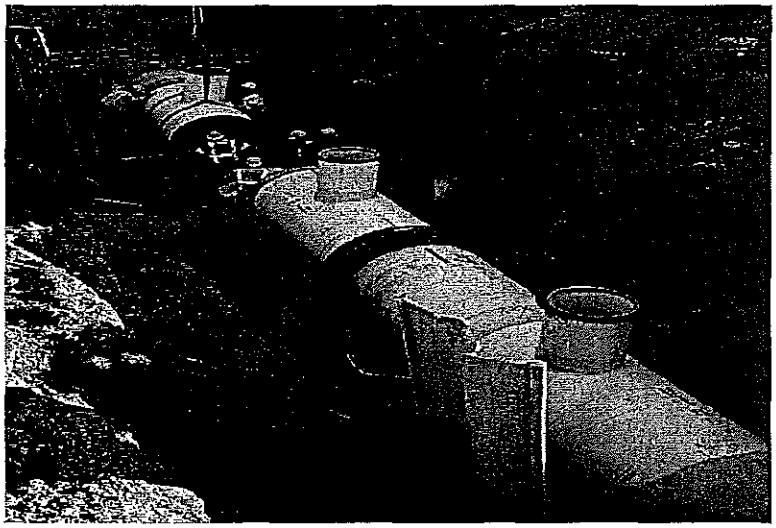


The Consumers Annual Water Quality Report provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing regulatory required testing results, and a table giving explanations of important terms to understand when viewing the test results. 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 USEPA 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. Flint is located roughly in the middle of the Flint River Watershed. The Flint River watershed includes Holloway Reservoir, C.S. Mott Lake, Kearsley Lake, and numerous streams and creeks that drain to these lakes or directly into the Flint River. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, and the City of Flint Utilities Department conducted a source water assessment in February 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Flint River source water intake is categorized as having a very high susceptibility to potential contaminant sources.

The use of the Flint River as a source water for the City of Flint Water Treatment Plant was a temporary move, driven largely by economics and the financial state of the City. The City of Flint joined the Karegnondi Water Authority (KWA) in 2010. The KWA consists of a group of local communities that decided to support and fund construction of a raw water pipeline to Lake Huron. The KWA will provide the City of Flint Water Treatment Plant with source water from Lake Huron. The KWA pipeline is currently under construction, and is scheduled to be completed by the end of 2016.



KWA pipeline construction

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

General Information (cont.)

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that the lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. If you are concerned about elevated lead levels in your home's water, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. 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.

2014 & Current Drinking Water Issues

The City of Flint did experience drinking water issues in the summer of 2014. Issues began with areas of the city experiencing "rusty" water. This was largely due to the fact that the city distribution system contains hundreds of miles of cast iron pipe. As these pipes age and degrade, iron is released, causing the water to exhibit color. The change in source water, water main breaks, and routine maintenance to the system also contributed to this problem.

The City of Flint received violations from the Michigan Department of Environmental Quality (MDEQ). The violations included a total coliform and E. coli in August and September of 2014, and a corresponding total trihalomethanes (TTHM) violation in December of the same year. As the city distribution system testing began to detect bacteria, system flushing increased, and chlorine addition to the water at the treatment plant also increased. The resulting increased chlorine addition then resulted in the higher formation of trihalomethanes.

While facing these issues, the City of Flint took steps to confer with industry professionals and state regulators in regards to treatment plant operation and distribution system operation. In November, TTHM levels were below the Maximum contaminant level set forth in the Michigan Safe Drinking Water Act.

Moving Forward

The City of Flint has taken many steps to correct the underlying issues that resulted in the drinking water violations. Water Treatment Plant corrective actions that were taken immediately after the issues occurred included:

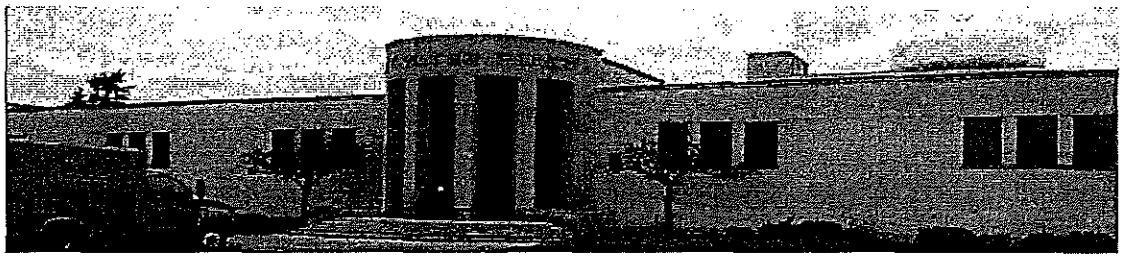
- Limiting the use of storage reservoirs during the warm weather months.
  - Warm water temperatures and water age are large contributors to the formation of THM's.
- Optimizing ozone pretreatment by updating control programming along with cleaning and inspection of the ozone generators.
  - Ozone is a powerful oxidant that provides a level of disinfection along with taste and odor control.
- Currently finalizing the installation of granular activated carbon (GAC) to the filtration process, which should be complete by the end of July 2015.
  - GAC will reduce THM's by removing the chemical precursors that react with chlorine to form the THM's.

Moving Forward (cont.)

Distribution system corrective actions that were enacted include:

- Increased water main flushing in an effort to alleviate stagnant water.
- Update distribution system water hydraulic model, to determine possible problem areas.
- Repaired or replaced several large water main valves, which were inhibiting the designed flow of water through the system.
- Planning and budgeting of 24' transmission water main repair in area of concern in the distribution system.
- Begin a complete distribution system evaluation of the 7000 water main valves that control the flow of water throughout the city. This project will be complete in July of 2015 and will provide information on where to proceed with further repairs and future projects.

The City of Flint is dedicated to resolving the issues that are facing the water system, and will continue to move forward as we prepare for the future. The City would like to thank all the residents and customers for their patience and understanding as we face the challenges ahead. The trials and tribulations that we have faced with the switch to the Flint River as a source water will prove to be important as we move ahead as a member of the KWA. Some of the distribution system issues experienced in 2014 while using the Flint River may also have been experienced with a different source water. As we continue to address the issues and take steps to be proactive, we can assure a future of quality drinking water in the City of Flint.



If you have any questions about this report or other concerns please contact the City of Flint Water Plant (810) 787-6537.

2014 Regulated Detected Contaminants
Monitored at Treatment Plant

Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Inorganic Chemicals						
Fluoride	mg/L	4	4			No
Nitrate	mg/L	10	10	0.5	0 – 0.5	No
Metals						
Barium	mg/L	2	2	0.03	0.02 – 0.03	No
Selenium	mg/L	0.05	0.05	0.001	0 – 0.001	No
Pesticides						
Atrazine	mg/L	0.03	0.03	0.0003	0 – 0.0003	No
Organics						
Total Xylenes	mg/L	10	10	0.0005	0 – 0.0005	No

More than 100 other chemicals were monitored throughout the year that were not detected. The list of various classifications these chemicals are associated with include metals, carbamates, herbicides, pesticides, organics, and radiological.

Total Organic Carbon, TOC			
Regulated Contaminant	Required Monthly % Removal	Minimum Monthly % Removal	Monthly % Removal Ranges
Total Organic Carbon	50	53	53 - 68

Finished water and Source water samples are collected and analyzed monthly to calculate percent removal. Total organic carbon includes numerous chemicals that are found naturally in surface waters. Certain chemicals found in this group are precursors to the disinfection byproducts trihalomethanes and haloacetic acids.

Turbidity		
Highest Single Measurement (Cannot exceed 1NTU)	Lowest Monthly % of Samples Meeting Turbidity Limit (< 0.3 NTU in 95% of samples)	Violation
0.22	99.1	No

Turbidity is a measure of the apparent cloudiness of water, usually attributed to particulate matter. The turbidity data in the chart above is measured from the water plant tap every 4 hours. Turbidity is monitored throughout each stage of the treatment process in 4 hour intervals, and in one of the final stages of treatment, filtration, turbidity is monitored continuously with in line meters, and verified every 4 hours in the laboratory.

In 2014, the EPA required the City of Flint and other communities to conduct further testing on unregulated contaminants at the treatment plant and the maximum residence time in the distribution system. The monitoring results will be utilized by the EPA to determine if these chemicals should be regulated. The unregulated contaminant monitoring that yielded results are presented in the chart below

Unregulated Contaminant Monitoring			
Regulated Contaminant	Unit of Measure	Highest Level Detected	Range of Detection
Chromium	ug/L	0.40	0 – 0.4
Hexavalent Chromium	ug/L	0.40	0.34 – 0.40
Strontium	ug/L	130	120 – 130
Vanadium	ug/L	0.20	0 – 0.20

2014 Regulated Detected Contaminants Monitored in Distribution System

Disinfectant Residuals						
Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Total Chlorine Residual	mg/L	4.0	4.0	3.5	0.1 – 3.5	No

Microbiological Contaminants				
Regulated Contaminant	MCL G	MCL	Highest Number detected (in 1 month)	Violation
Total Coliform bacteria	0	The presence of coliform bacteria in > 5% of monthly samples	15	Yes
E. coli Bacteria	0	0	1	Yes

Disinfectant residuals and microbiological contaminants are monitored at 8 locations throughout the city distribution system, and at the 2 drinking water reservoirs and pump stations located out in the distribution system. At least 100 samples are collected and analyzed each month.

Lead & Copper						
Regulated Contaminant	Unit of Measure	MCLG	Action Level AL	90th Percentile Value	Number of samples over AL	Violation
Lead	ug/L	0	15	6	2	No
Copper	mg/L	1.3	1.3	0.11	0	No

Lead and copper monitoring was conducted from June through December 2014 with the collection of 100 samples. Samples were collected by residents from the taps at their residence. Thank you to all who participated in collecting samples.

Disinfection By-Products						
Regulated Contaminant	Unit of Measure	MCL G	MCL	Highest Level Detected	Range of Detection	Violation
Total Trihalomethanes (TTHM)	ug/L	n/a	80	196	33.3 -196.2	Yes
Haloacetic Acids (HAA)	ug/L	n/a	60	64	5 - 64	No
Bromate	ug/L	10	10	23	0 - 23	No

Disinfection by-products occur as a result of the water treatment process. Bromate is formed as a result of using ozone as a treatment additive. Ozone is used to help control taste and odor issues, and as a pre-treatment disinfection. Naturally occurring bromide reacts with Ozone to generate bromate. Bromate is monitored monthly, and compliance is based on a yearly average.

TTHM's and HAA's are formed as a result of utilizing chlorine in the treatment process. Naturally occurring compounds known as TOC's (total organic carbon) react with chlorine to form TTHM's and HAA's. The temperature and the age of water increase the formation of THM's and HAA's, and as a result, during the warm months of the year is when levels were at their highest. Samples are tested quarterly from 8 sites throughout the distribution system and compliance is based on a running annual average at each individual site.

Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in d water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
mg/L	Milligrams per Liter	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
pCi/L	Picocuries per Liter	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.
ug/L	Micrograms per Liter	A microgram = 1/1,000,000 gram 1 microgram per liter is equal to 1ppb

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY
CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name:	City of Flint	County:	Genesee	WSSN:	2310
Population:	☐ 500 or fewer people	☐ 501 – 9,999 people	☒ 10,000 or more people		

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Method of delivery to DEQ

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: September 8, 2015

Method of delivery to Local Health Department

☐ Mail ☐ Email ☒ Hand Delivery ☐ Other _____ Date delivered: June 30, 2015

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

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☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: _____
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> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
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Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☐ Internet address: _____ Date accessible: _____

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: _____
☒ Mail to each service connection physical address. Date(s) mailed: June 29, 2015
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☐ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☐ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☐ Deliver the report to community organizations.
☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

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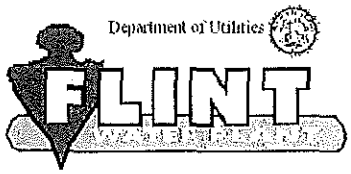
Name/Title: Brent Wright Supervisor

Signature: _____ Date: September 8, 2015

See reverse side for U.S. EPA Expectations for Electronic Delivery of CCR

Detroit



City of Flint
Water Plant & Facilities

2014 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities 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 at the City of Flint web page on the Internet at *www.cityofflint.com* or by calling the Flint Water Plant & Facilities 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 be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

From January 1st through April 30th 2014, The City of Flint purchased drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that the lead levels at your hoe may be higher than at other homes in the community as a result of materials used in your home's plumbing Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. If you are concerned about elevated lead levels in your home's water, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. 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.

Lake Huron Water Treatment Plant
2014 Regulated Detected Contaminants Tables

Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Inorganic Chemicals – Monitoring at the Plant Finished Water Tap								
Fluoride	5/13/14	ppm	4	4	0.59	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	5/13/14	ppm	10	10	0.31	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Disinfection By-Products – Monitoring in Distribution System Stage 2 Disinfection By-Products								
Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Highest LRAA	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Total Trihalomethanes (TTHM)	2014	ppb	n/a	80	33.0	10.0 - 48.5	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	2014	ppb	n/a	60	15.8	8.0 – 19.0	No	By-product of drinking water disinfection
Disinfectant Residuals Monitoring in DWSD Distribution System								
Regulated Contaminant	Test Date	Unit	Health Goal MRDGL	Allowed Level MRDL	Highest RAA	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Total Chlorine Residual	Jan-Dec 2014	ppm	4	4	0.82	0.64-0.94	No	Water additive used to control microbes

Regulated Contaminant	Treatment Technique	Typical Source of Contaminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.	Erosion of natural deposits

2014 Turbidity – Monitored every 4 hours at Plant Finished Water Tap			
Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)	Violation yes/no	Major Sources in Drinking Water
0.19 NTU	100%	No	Soil Runoff
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.			

2014 Microbiological Contaminants – Monthly Monitoring in Distribution System					
Regulated Contaminant	MCLG	MCL	Highest Number Detected	Violation yes/no	Major Sources in Drinking Water
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	0	No	Naturally present in the environment.
E.coli Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap								
Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number of Samples Over AL	Violation yes/no	Major Sources in Drinking Water
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.10	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.

2014 Radionuclides

Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Level Detected	Violation yes/no	Major Sources in Drinking Water
Combined Radium Radium 226 & 228	5/13/14	pCi/L	0	5	0.86 + or - 0.55	No	Erosion of natural deposits

014 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.78	Erosion of natural deposits

collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen

city of Flint sample result information provided by the City of Flint Water Plant, M. Glasgow.

2014 Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
mg/L	Milligrams per Liter	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
pCi/L	Picocuries per Liter	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.

23 IC

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name:	City of Flint	County:	Genesee	WSSN:	2310
Population:	☐ 500 or fewer people	☐ 501 – 9,999 people	☒ 10,000 or more people		

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). **Return the certification to the appropriate DEQ district office by October 1**. For addresses, visit www.michigan.gov/deq, click on Locations.

Method of delivery to DEQ

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: 6/25/2014

Method of delivery to Local Health Department

☒ Mail ☐ Email ☐ Hand Delivery ☐ Other _____ Date delivered: 6/25/2014

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

☒ Mail or hand deliver a paper copy of CCR. Date(s) mailed or hand delivered: 6/24/2014
☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: _____
☐ Email notification that CCR is available at direct URL: Date(s) emailed: _____
☐ Email notification that CCR is attached to the email. Date(s) emailed: _____
☐ Email notification that CCR is embedded in the email. Date(s) emailed: _____

If using notification of CCR availability:

1. Mail a paper CCR to customers who request it and to customers known to be incapable of receiving electronically.
2. Include a copy of the notification to the DEQ district office with this certification form.
3. Explain the nature of the notification, prominently display the direct URL, include statement how to request a paper copy.

> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
> Message: Your annual report on the source and quality of your drinking water is available on the Web at **www.anytown.gov/waterqualityreport**. To have a copy mailed to you, contact Anytown at 555-111-1111 or water@anytown.gov.

☐ **Option for supplies serving fewer than 10,000 persons**: Publish entire report in newspaper, and notify customers via newspaper(s) in which CCR published, mail, email or hand delivery that individual copies will not be mailed, and include statement how to request a paper copy.
Date(s) of publication: _____

☐ **Option for supplies serving 500 or fewer persons**: Notify customers via mail, email, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply on request.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: www.cityofflint.com/utilities/utilities.asp Date accessible: 6/26/2014

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: _____
☒ Mail to each service connection physical address. Date(s) mailed: 6/24/2014
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☐ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☐ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☐ Deliver the report to community organizations.
☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

A Tier 3 Public Notice is Distributed with this CCR

☐ This CCR is being used to deliver a Tier 3 Public Notice for one or more violations. To use this Tier 3 delivery option, the CCR must be directly delivered to each bill paying customer or, with DEQ approval, continuously posted, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent F. Wright / Water Plant Supervisor

Signature: _____ Date: 6/25/2014

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 27 2014
LANSING DISTRICT

See reverse side for U.S. EPA Expectations for Electronic Delivery of CCR

02310

CUSTOMER SERVICE CENTER
CITY HALL
1101 S. SAGINAW ST.
FLINT, 48501

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 27 2014
LANSING DISTRICT

Department of Utilities
FLINT
WATER PLANT

City of Flint
Water Plant & Facilities

2013 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities 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 at the City of Flint web page on the Internet at www.cityofflint.com or by calling the Flint Water Plant & Facilities 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 be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

In 2013, The City of Flint purchased drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

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 Department of Utilities 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 your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 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.

Lake Huron Water Treatment Plant
20[illegible] Regulated Detected Contaminants [illegible]bles

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation	Major Sources in Drinking Water
Inorganic Chemicals – Monitoring at Plant Finished Water Tap								
Fluoride	05/13/2013	ppm	4	4	0.55	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	05/13/2013	ppm	10	10	0.32	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Barium	6/9/2008	ppm	2	2	0.01	n/a	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits

Disinfection By-Products – Monitoring in Distribution System								
Contaminant	**Test Date**	**Units**	**Health Goal MCLG**	**Allowed Level MCL**	**Highest LRAA**	**Range of Detection**	**Violation**	**Major Sources in Drinking Water**
Total Trihalomethanes (TTHM)	2013	ppb	n/a	80	37.8	11.5 – 43.8	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	2013	ppb	n/a	60	17.0	6.0 – 19.0	No	By-product of drinking water disinfection

Disinfectant Residuals Monitoring in Distribution System								
Contaminant	**Test Date**	**Units**	**Health Goal**	**Allowed Level**	**Highest RAA**	**Range of Detection**	**Violation**	**Major Sources in Drinking Water**
Disinfectant Total Chlorine Residual	Jan-Dec 2013	ppm	MRDGL 4	MRDL 4	0.81	0.65-0.93	No	Water additive used to control microbes

2013 Turbidity – Monitored every 4 hours at Plant Finished Water Tap			
Highest Single Measurement Cannot exceed 1 NTU	**Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)**	**Violation**	**Major Sources in Drinking Water**
0.26 NTU	100%	No	Soil Runoff
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.			

2013 Microbiological Contaminants – Monthly Monitoring in Distribution System					
Regulated Contaminant	**MCLG**	**MCL**	**Highest Number Detected**	**Violation**	**Major Sources in Drinking Water**
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	in one month 1	No	Naturally present in the environment.
E.coli or Fecal Coliform Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	entire year 0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap								
Regulated Contaminant	**Test Date**	**Units**	**Health Goal MCLG**	**Action Level AL**	**90th Percentile Value***	**Number of Samples Over AL**	**Violation**	**Major Sources in Drinking Water**
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.10	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.
*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.								

Regulated Contaminant	Treatment Technique	Typical Source of Contaminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.	Erosion of natural deposits

2013 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.52	Erosion of natural deposits

Collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen

Additional sample result information provided by the City of Flint Water Plant Laboratory, M Glasgow

2013 Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.

2310

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY
CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

ENTERED

Supply Name:	City of Flint	County:	Genesee	WSSN:	2310
Population:	☐ 500 or fewer people	☐ 501 – 9,999 people	☒ 10,000 or more people		

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). Return the certification to the appropriate DEQ district office by October 1. For addresses, visit www.michigan.gov/deq, click on Contact Information in the right column, click on DEQ District Locations and scroll down to the list of DEQ district offices.

Method of delivery to DEQ

☐ Mail ☒ Email ☐ Hand Delivery ☐ Other _____ Date delivered: July 1 2013

Method of delivery to Local Health Department

☐ Mail ☐ Email ☒ Hand Delivery ☐ Other _____ Date delivered: June 28 2013

Method or combination of methods to directly deliver CCR to each bill paying customer. Check all that apply.

☒ Mail or hand deliver a paper copy of CCR. Date(s) mailed or hand delivered: Mailed June 25 2013
☐ Mail or hand deliver notification that the CCR is available at a direct URL. Date(s) delivered to customers: _____
☐ Email notification that CCR is available at direct URL: Date(s) emailed: _____
☐ Email notification that CCR is attached to the email. Date(s) emailed: _____
☐ Email notification that CCR is embedded in the email. Date(s) emailed: _____

If using notification of CCR availability:

1. Mail a paper CCR to customers who request it and to customers known to be incapable of receiving electronically.
2. Include a copy of the notification to the DEQ district office with this certification form.
3. Explain the nature of the notification, prominently display the direct URL, include statement how to request a paper copy.

> Example of Notification of CCR Availability Subject Line: 2012 Drinking Water Quality Report Available.
> Message: Your annual report on the source and quality of your drinking water is available on the Web at **www.anytown.gov/waterqualityreport**. To have a copy mailed to you, contact Anytown at 555-111-1111 or water@anytown.gov.

☐ **Option for supplies serving fewer than 10,000 persons:** Publish entire report in newspaper, and notify customers via newspaper(s) in which CCR published, mail, email or hand delivery that individual copies will not be mailed, and include statement how to request a paper copy.
Date(s) of publication: _____

☐ **Option for supplies serving 500 or fewer persons:** Notify customers via mail, email, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply on request.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: www.cityofflint.com/images/20212%20Water%20Qualit%20Report.pdf
Date accessible: July 1 2013

DEQ RESOURCE MANAGEMENT DIVISION JUL 08 2013 LANSING DISTRICT

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) above). Check all that apply.

☐ Mail the report to all postal patrons. Zip codes and dates mailed: _____
☐ Mail to each service connection physical address. Date(s) mailed: _____
☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.
☐ Publish the report in a local newspaper.
☒ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.
☒ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.
☒ Deliver the report to community organizations.
☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

A Tier 3 Public Notice is Distributed with this CCR

☐ This CCR is being used to deliver a Tier 3 Public Notice for one or more violations. To use this Tier 3 delivery option, the CCR must be directly delivered to each bill paying customer or, with DEQ approval, continuously posted, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brant Wright Water Plant Supervisor

Signature: _____ Date: July 2 2013

2310

ENTERED

DEQ
RESOURCE MANAGEMENT DIVISION
JUL 01 2013
LANSING DISTRICT

Department of Utilities

FLINT WATER PLANT

City of Flint
Water Plant & Facilities

2012 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities 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 at the City of Flint web page on the Internet at *www.cityofflint.com* or by calling the Flint Water Plant & Facilities 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 be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

The City of Flint purchases drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

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 Department of Utilities 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 your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 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.

Lake Huron Water Treatment Plant
2012 Regulated Detected Contaminants Tables

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Inorganic Chemicals – Monitoring at Plant Finished Water Tap								
Fluoride	8/14/2012	ppm	4	4	0.71	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	8/14/2012	ppm	10	10	0.32	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Barium	6/9/2008	ppm	2	2	0.01	n/a	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Disinfection By-Products – Stage 1, 1st Quarter Monitoring in Distribution System								
Total Trihalomethanes (TTHM)	Mar 2012	ppb	n/a	80	15.0	12.0-15.0	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	Mar 2012	ppb	n/a	60	10.0	7.0-10.0	No	By-product of drinking water disinfection
Disinfection By-Products – Stage 2, 2nd - 4th Quarter Monitoring in Distribution System								
Total Trihalomethanes (TTHM)	May-Nov 2012	ppb	n/a	80	57.8	15.2-57.8	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	May-Nov 2012	ppb	n/a	60	19.0	8.0-19.0	No	By-product of drinking water disinfection
Disinfectant Residuals Monitoring in Distribution System								
Disinfectant (Total Chlorine residual)	Jan-Dec 2012	ppm	MRDGL 4	MRDL 4	1.40	0.10-1.40	No	Water additive used to control microbes

2012 Turbidity – Monitored every 4 hours at Plant Finished Water Tap

Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)	Violation yes/no	Major Sources in Drinking Water
0.13 NTU	100%	No	Soil Runoff

Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

2012 Microbiological Contaminants – Monthly Monitoring in Distribution System

Regulated Contaminant	MCLG	MCL	Highest Number Detected	Violation yes/no	Major Sources in Drinking Water
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	in one month 4	No	Naturally present in the environment.
E.coli or Fecal Coliform Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	entire year 0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number of Samples Over AL	Violation yes/no	Major Sources in Drinking Water
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.102	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.

Regulated Contaminant	Treatment Technique	Running annual average	Monthly Ratio Range	Violation Yes/No	Typical Source of Contaminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.				Erosion of natural deposits

2012 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.74	Erosion of natural deposits

Collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen

Key to Detected Contaminants Table		
Symbol	**Abbreviation for**	**Definition/Explanation**
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
ppb	Parts per billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts per million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
ND	Not Detected	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.
pCi/l	picocuries per liter	a measure of radioactivity
n/a	not applicable	
<	Less than	
>	Greater than	

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
RESOURCE MANAGEMENT DIVISION

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name:	City of Flint	County: Genesee	WSSN: 2310
Population:	☐ 500 or fewer people	☐ 501 - 9999 people	☒ 10,000 or more people

Community water supplies must confirm that the Consumer Confidence Report (CCR) and any enclosed Public Notices (PN) or notices of CCR availability, have been distributed to customers by July 1 as required under administrative rules R 325.10415 and R 325.10404(4)(c). Supplies must also certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). **Return the certification to the appropriate DEQ district office by October 1.** For addresses, visit www.michigan.gov/deq, click on Contact Information in the right column, click on DEQ District Locations and scroll down to the list of DEQ district offices.

Method of delivery to DEQ

☒ Mail ☐ Hand Delivery ☐ Other _____ Date delivered: 6/28/2012

Method of delivery to Local Health Department

☐ Mail ☒ Hand Delivery ☐ Other _____ Date delivered: 6/29/2012

Primary method of delivery to customers (select one)

☒ Direct mailing to all customers. Date(s) mailed: 7/14/2012

☐ Hand delivery to all customers. Date(s) delivered: _____

☐ Publish entire report in newspaper, and notify customers via newspaper or mail that individual copies will not be mailed, and notify customers how to obtain copies of the report.
This option is available only to supplies serving fewer than 10,000 persons.
Date(s) of publication: _____

☐ Notify customers via newspaper, mail, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply upon request.
This option is available only to supplies serving fewer than 501 persons.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: www.cityofflint.com Date accessible: 6/13/2012

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) indicated above - select all that apply)

DEQ
RESOURCE MANAGEMENT DIVISION

☐ Mail the report to all postal patrons.
Zip codes and dates mailed: _____ SEP 10 2012

☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.

☐ Publish the report in a local newspaper. LANSING DISTRICT

☒ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.

☒ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.

☒ Deliver the report to community organizations.

☐ Other: _____

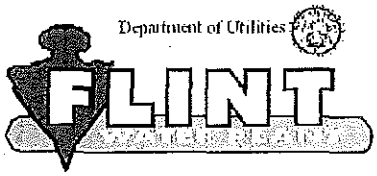
Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

Use of CCR to satisfy Tier 3 Public Notice requirements

☐ This CCR is being used to satisfy Tier 3 Public Notice requirements for one or more violations. The CCR must be delivered by direct mail, hand delivery or, with DEQ approval, continuous posting, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent F. Wright Plant Supervisor

Signature: _____ Date: 8/30/ 2012



City of Flint
Water Plant & Facilities

2011 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing a high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities maintains total 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 at the City of Flint web page on the Internet at *www.cityofflint.com* or by calling the Flint Water Plant & Facilities 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 be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

The City of Flint purchases drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

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- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

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Lake Huron Water Treatment Plant
2011 Regulated Detected Contaminants Tables

Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Inorganic Chemicals – Annual Monitoring at Plant Finished Water Tap								
Fluoride	08/14/2011	ppm	4	4	0.98	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	08/14/2011	ppm	10	10	0.30	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Barium	6/9/2008	ppm	2	2	0.01	n/a	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Disinfectant Residuals and Disinfection By-Products – Monitoring in Distribution System								
Total Trihalomethanes (TTHM)	Feb-Nov 2011	ppb	n/a	80	36.0	11.0 - 36.0	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	Feb- Nov 2011	ppb	n/a	60	14.0	6.0 - 14.0	No	By-product of drinking water disinfection
Disinfectant (Total Chlorine Residual)	Jan-Dec 2011	ppm	MRDGL 4	MRDL 4	1.10	0.30 – 1.10	No	Water additive used to control microbes

2011 Turbidity – Monitored every 4 hours at Plant Finished Water Tap			
Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)	Violation yes/no	Major Sources in Drinking Water
0.2 NTU	100%	No	Soil Runoff
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.			

2011 Microbiological Contaminants – Monthly Monitoring in Distribution System					
Contaminant	MCLG	MCL	Highest Number Detected	Violation yes/no	Major Sources in Drinking Water
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	0	No	Naturally present in the environment.
E.coli or fecal coliform bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap								
Contaminant	Test Date	Units	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number of Samples Over AL	Violation yes/no	Major Sources in Drinking Water
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.102	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.
*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.								

Regulated Contaminant	Treatment Technique	Running annual average	Monthly Ratio Range	Violation Yes/No	Typical Source of Conataminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.				Erosion of natural deposits

2011 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.76	Erosion of natural deposits

Collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen.

Distribution system sampling & result information (including lead & copper) provided by the City of Flint Water Plant, M Glasgow.

Key to Detected Contaminants Table		
Symbol	**Abbreviation for**	**Definition/Explanation**
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MRDLG	Maximum Residual Disinfectant level goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
ppb	Parts per billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts per million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
ND	Not Detected	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total of all five.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromochloromethane and bromoform. Compliance is based on the total of all five.
pCi/l	picocuries per liter	A measure of radioactivity.
n/a	not applicable	
>	Greater than	

2310

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
RESOURCE MANAGEMENT DIVISION

CONSUMER CONFIDENCE REPORT FOR COMMUNITY WATER SUPPLY
CERTIFICATE OF DISTRIBUTION

Issued under authority of 1976 PA 399 and Administrative Rules, as amended.
Failure to submit certification is a violation of the Act and may subject the water supply to enforcement penalties.

Supply Name: City of Flint		County: Genesee	WSSN: 2310
Population:	☐ 500 or fewer people	☐ 501 - 9999 people	☒ 10,000 or more people

Administrative Rule R 325.10415 and R 325.10404(4)(c) requires the community water supply to confirm that the *Consumer Confidence Report* (CCR) and any Public Notices (PN) enclosed with it have been distributed to customers (and appropriate notices of availability have been given) according to the CCR requirements and PN requirements, if applicable. Delivery is due by July 1 following the year covered by the CCR. Further, the supply shall certify that the information contained in the CCR is correct and consistent with the compliance monitoring data previously submitted to the Michigan Department of Environmental Quality (DEQ). Return certification to the appropriate DEQ district office by October 1 following the year covered by the report. For district office addresses, visit www.michigan.gov/deq and click on Contacts.

Method of delivery to DEQ

☒ Mail ☐ Hand Delivery ☐ Other _____ Date delivered: 6/29/11

Method of delivery to Local Health Department

☐ Mail ☒ Hand Delivery ☐ Other _____ Date delivered: 6/30/11

Primary method of delivery to customers (select one)

☒ Direct mailing to all customers. Date(s) mailed: 6/29/11

☐ Hand delivery to all customers. Date(s) delivered: _____

☐ Publish entire report in newspaper, and notify customers via newspaper or mail that individual copies will not be mailed, and notify customers how to obtain copies of the report.
This option is available only to supplies serving fewer than 10,000 persons.
Date(s) of publication: _____

☐ Notify customers via newspaper, mail, hand delivery or, with DEQ approval, posting in public places, that a copy of the report is available from the water supply upon request.
This option is available only to supplies serving fewer than 501 persons.
Date(s) of notification: _____

Post on Internet (required for supplies serving ≥100,000, optional for others)

☒ Internet address: www.cityofflint.com Date accessible: 7/5/11

"Good Faith" efforts to reach non-bill-paying consumers (in addition to the method(s) indicated above - select all that apply)

☐ Mail the report to all postal patrons.
Zip codes and dates mailed: _____

☐ Advertise the availability of the report in the newspapers, on TV, and on the radio.

☐ Publish the report in a local newspaper.

☒ Post the report in public places such as cafeterias in public buildings, libraries, churches, and schools.

☒ Deliver multiple copies for distribution by single-bill customers, e.g., apartments or private employers.

☐ Deliver the report to community organizations.

☐ Other: _____

Send to the DEQ a copy of the news articles, a list of channels broadcast and dates, and a list of locations/organizations reports delivered to and dates.

Use of CCR to satisfy Tier 3 Public Notice requirements

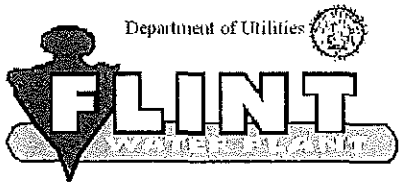
☐ This CCR is being used to satisfy Tier 3 Public Notice requirements for one or more violations. The CCR must be delivered by direct mail, hand delivery or, with DEQ approval, continuous posting, and must be issued within 12 months of learning of the violation. A copy of this form must be delivered to the DEQ within 10 days of delivering the CCR to customers to meet the public notification requirements.

Name/Title: Brent F. Wright Water Plant Supervisor

DEQ
RESOURCE MANAGEMENT DIVISION
SEP 19 2011
LANSING DISTRICT

Signature: _____ Date: 9/14/11 810-787-6537

EQP 5943 (Rev. 3/2011)



City of Flint
Water Plant & Facilities

2010 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing a high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, contaminant & health related information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities maintains total 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 at the City of Flint web page on the Internet at *www.cityofflint.com* or by calling the Flint Water Plant & Facilities 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 be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

The City of Flint purchases drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City.

The source water comes from the lower Lake Huron watershed. The watershed includes numerous short, seasonal streams that drain to Lake Huron. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to more information about this report or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

Health Information

To ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

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 Department of Utilities 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 your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 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.

The City of Flint Water Plant conducts lead & copper monitoring every three years from a limited number of consumer taps. The next monitoring will take place from July 1st through September 1st of 2011. If you are interested in using your residence as a sample location in this round of monitoring, please contact the City of Flint Water Plant laboratory at (810) 787-6537 to determine if your residence qualifies, and sample locations are still needed.

Lake Huron Water Treatment Plant
2010 [illegible]gulated Detected Contaminants [illegible]les

Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Inorganic Chemicals – Annual Monitoring at Plant Finished Water Tap								
Fluoride	Jan-Dec 2010	ppm	4	4	1.40	0.56-1.40	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	8/23/2010	ppm	10	10	0.32	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Barium	6/9/2008	ppm	2	2	0.01	n/a	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Disinfectant Residuals and Disinfection By-Products – Monitoring in Distribution System								
Total Trihalomethanes (TTHM)	Feb-Nov 2010	ppb	n/a	80	25.0	12.0-25.0	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	Feb- Nov 2010	ppb	n/a	60	18.0	7.0-18.0	No	By-product of drinking water disinfection
Disinfectant (Total Chlorine residual)	Jan-Dec 2010	ppm	MRDGL 4	MRDL 4	1.2	0.1-1.2	No	Water additive used to control microbes

2010 Turbidity – Monitored every 4 hours at Plant Finished Water Tap			
Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)	Violation yes/no	Major Sources in Drinking Water
0.09 NTU	100%	No	Soil Runoff
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.			

2010 Microbiological Contaminants – Monthly Monitoring in Distribution System					
Contaminant	MCLG	MCL	Highest Number Detected	Violation yes/no	Major Sources in Drinking Water
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	In one month 1%	No	Naturally present in the environment.
E.coli or fecal coliform bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	entire year 0	No	Human waste and animal fecal waste.

2008 Lead and Copper Monitoring at Customers' Tap								
Contaminant	Test Date	Units	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number of Samples Over AL	Violation yes/no	Major Sources in Drinking Water
Lead	2008	ppb	0	15	0.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2008	ppm	1.3	1.3	0.027	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.
*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.								

Regulated Contaminant	Treatment Technique	Running Annual Average	Monthly Ratio Range	Violation Yes/No	Typical Source of Contaminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.				Erosion of natural deposits

2010 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.45	Erosion of natural deposits

Collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen.

Distribution & consumers tap sampling result information provided by the City of Flint Water Plant, M Glasgow.

Key to Detected Contaminants Table		
Symbol	**Abbreviation for**	**Definition/Explanation**
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MRDLG	Maximum Residual Disinfectant level goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
ppb	Parts per billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts per million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
ND	Not Detected	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total of all five.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromochloromethane and bromoform. Compliance is based on the total of all five.
pCi/l	picocuries per liter	A measure of radioactivity.
n/a	not applicable	
>	Greater than	

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, October 07, 2015 10:37 AM
To: Bean, Lawrence (DEQ)
Subject: RE: PEAS-13537: Caller upset about how DEQ is handling City of Flint Drinking water, Genesee County

Spoke with the caller on 10/1 and answered his questions.

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

From: Bean, Lawrence (DEQ)
Sent: Thursday, October 01, 2015 4:25 PM
To: Henney, Autumn (DEQ); DEQ-PEAS-Lansing
Cc: Prysby, Mike (DEQ)
Subject: RE: PEAS-13537: Caller upset about how DEQ is handling City of Flint Drinking water, Genesee County

File
Mike Prysby will call this person back to answer questions.

Larry Bean
Jackson & Lansing District Supervisor
Office of Waste Management and Radiological Protection
Michigan Department of Environmental Quality
Phone 517-416-4375
BEANL@michigan.gov

From: Henney, Autumn (DEQ)
Sent: Thursday, October 01, 2015 4:04 PM
To: DEQ-PEAS-Lansing
Subject: PEAS-13537: Caller upset about how DEQ is handling City of Flint Drinking water, Genesee County

Please confirm receipt and advise who is lead agency. Caller expects a call right back.

Autumn B. Henney
Lansing District Office
Remediation and Redevelopment Division
Phone: 517-284-5125
HenneyA@michigan.gov

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, October 02, 2015 10:04 AM
To: sheila.bw@hotmail.com
Cc: Busch, Stephen (DEQ); Benzie, Richard (DEQ)
Subject: RE: Ticket #23002-490657 Response Sent

Sheila,

I am responding to your e-mail to address your concerns with lead Flint's drinking water. The drinking water treated at the Water Treatment Plant (WTP) and distributed to Flint residents meets all applicable drinking water standards and has not detected the presence of lead in any plant tap samples (water that leaves the WTP). Although the drinking water standards are being met, and compliance with the Action Level for lead is being achieved (90% of selected sites sampled throughout the city are at or below the 15 parts per billion Action Level for lead in accordance to EPA's monitoring requirements), there is no safe level for lead in drinking water. Compliance with the lead Action Level; however, does not mean that under certain conditions that some residents may have water within their domestic plumbing system that has leached lead from either a lead service line or lead solder.

The only way to know if you are being exposed to a higher concentration of lead at your residency is to have a sample collected from your residency and analyzed for lead at a certified laboratory. It is our understanding that the city of Flint is working with their customers on lead sampling requests without charge. You will need contact the city to arrange for the sampling.

If lead is present in the water at your home or if there is uncertainty, our advice is to minimize stagnation of the water prior to consumption by running your faucet for several minutes to clear out the stagnated water from your plumbing and service line.

Below is a link that provide additional information regarding lead in drinking water.

http://water.epa.gov/drink/contaminants/basicinformation/lead.cfm

If you have any further concerns regarding lead in your drinking water or on any other water related matter, please don't hesitate to contact me.

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

From: Sheila Bailey-Waddell [mailto:sheila.bw@hotmail.com]
Sent: Wednesday, September 30, 2015 8:43 PM
To: Hill, Charles (DEQ); Selden, Barry (DEQ); Smith, Laura (DEQ); Prysby, Mike (DEQ)
Subject: RE: Ticket #23002-490657 Response Sent

Hello,

Have you not heard that the water quality in Michigan is detrimental to its residents? It is filled with lead; killing our children and the elderly who are most vulnerable. What is the EPA doing about this? Even the hospitals are forced to order distilled water for patients (in/out). I want expeditious answers.

Thank you,
Sheila

From: sheila.bw@hotmail.com
To: hillc@michigan.gov; seldenb@michigan.gov; smithl16@michigan.gov
Subject: FW: Ticket #23002-490657 Response Sent
Date: Thu, 7 May 2015 17:16:50 -0400

From: sheila.bw@hotmail.com
To: safewater_support@supportportal.com; bartholi@msu.edu; info@cityofflint.com; senator@stabenow.senate.gov; bennettc4@michigan.gov
Subject: RE: Ticket #23002-490657 Response Sent
Date: Thu, 7 May 2015 16:41:38 -0400

Hello,

It is unfortunate that you don't track local drinking water information. So in essence your tracking efforts are limited to the auspices of NRCS Water Division only for the conservation of farming and other natural (non-human) resources. What if, by chance, the local water source is not being accurate in their reporting of safe drinking water and source supply?

Thank you,
Sheila

http://mi.water.usgs.gov/pubs/MISC/RTSMI-0121/pdf/WTO222b.pdf

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From: safewater_support@supportportal.com
To: sheila.bw@hotmail.com
Date: Thu, 20 Feb 2014 08:25:04 -0500
Subject: Ticket #23002-490657 Response Sent

The Safe Drinking Water Hotline has responded to your question(s).

Hello,

Thank you for contacting the Safe Drinking Water Hotline. You had some concerns regarding your local water quality. Please review the information included below:

The Safe Drinking Water Hotline does not track local drinking water information. The best source of specific information about your drinking water is your water supplier. Water suppliers that serve the same people year-round are required to send their customers an annual water quality report called a Consumer Confidence Report (CCR). The CCR describes any contaminants that have been detected in your drinking water, how these detection levels compare to health-based national drinking water standards, and the source of your drinking water. To obtain a copy of your CCR, you may search online at http://cfpub.epa.gov/safewater/ccr/index.cfm. If your water system's report is not online, you should contact your local water provider to obtain a copy of this report. To find the telephone number for your local water provider, please check your water utility bill, your local phone book, or search online at http://cfpub.epa.gov/safewater/ccr/index.cfm.

If your city has a population in excess of 100,000, they are obligated to publish the reports online. Many local governments have sites where reports can be posted, even if a system itself does not have a site. EPA will make links from its Web site (http://water.epa.gov/drink/index.cfm) to all the reports of which it is aware (Preparing Your Drinking Water Consumer Confidence Report: Revised Guidance for Community Water Suppliers), EPA816-R-05-002).

If your city has not made the 2012 report available, please contact your state water program. They are the regulatory and enforcement agency for all public water systems in your state. The state water program should help you find the data. You can find contact information to your state by following the link below: http://water.epa.gov/drink/local/index.cfm.http://cfpub.epa.gov/safewater/ccr/index.cfm.

EPA's Safe Drinking Water Hotline answers questions about the regulations and programs developed in response to the Safe Drinking Water Act. The Safe Drinking Water Hotline provides information, including access to publications, on EPA's drinking water standards, source water protection, and underground injection wells. The Hotline also provides referrals to state public water supply supervision programs, state underground injection control programs, and state laboratory certification programs.

If you have additional questions, you may contact the Safe Drinking Water Hotline at the following number: (800) 426-4791 -- Toll Free

For more information, please visit EPA's Office of Ground Water and Drinking Water Internet web site: http://water.epa.gov/drink/index.cfm.

Thank you for your interest in safe drinking water.

Ticket Information:

Ticket #:	23002-490657
Date Created:	2/19/2014 02:18 PM EST
Subject:	Water Quality Assessment
Question:	I live in Flint Michigan. What I have learned is Michigan appears to have 2012 and 2014 reports but neither are being reported by EPA. On this side of reporting for this data, we have no information as to the status of the 2012 or 2014 data. There are automotive plants in my area and the water quality is suspected to be less than satisfactory for residents.

To update or check the status of this Ticket:

1. Go to: http://safewater.supportportal.com/link/portal/23002/23015/Ticket/490657
2. Log in, and you will be automatically taken to the Ticket page.

Prysby, Mike (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Monday, May 11, 2015 10:09 AM
To:	sheila.bw@hotmail.com
Cc:	Busch, Stephen (DEQ); Benzie, Richard (DEQ); Devereaux, Tracy (DEQ); Smith, Laura (DEQ)
Subject:	Ticket #23002-490657
Attachments:	Flint 2013 CCR.pdf

Shelia,

Based on the e-mail thread, Flint's Consumer Confidence Report (CCR) provided to Flint residents may address your question. Attached is Flint's 2013 CCR that summarizes the quality of the drinking water provided to residents (including detected contaminants) for the 2012 calendar year. We have not received Flint's 2015 CCR since the deadline for the city to distribute it to residents and the MDEQ is July 1, 2015. Also, our department is not involved with or have control on how monitoring results and/or violations are presented on other websites that may contain information on Flint's water quality . As always, if you have further questions concerning Flint's drinking water quality and detected contaminates, feel free to contact me.

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

Prysby, Mike (DEQ)

From: Busch, Stephen (DEQ)
Sent: Friday, May 08, 2015 2:19 PM
To: Benzie, Richard (DEQ)
Cc: Rosenthal, Adam (DEQ); Prysby, Mike (DEQ); Devereaux, Tracy Jo (DEQ)
Subject: Re: Ticket #23002-490657 Response Sent

I got this from chuck Bennett late yesterday. We will email the ccr for the period in question and offer contact for further assistance as needed

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

Sent from my iPhone

On May 8, 2015, at 2:15 PM, Benzie, Richard (DEQ) <BENZIER@michigan.gov> wrote:

> I don't know if you have had any contact with this person and I am unsure that a response is necessary, as it was forwarded as an FYI.
>
> It is difficult to determine what is being requested, but it looks like a customer of Flint asked EPA for drinking water quality and when EPA told her to contact her water system, she tried to get the information from the state but contacted WRD. It also sounds like she questions relying upon the local supplier to report monitoring results.
>
> You could contact her to see if we can be of assistance or send her a message indicating that we (you) are the source of drinking water information if she doesn't want to get it from the city.
>
> ---
>
> **From:** Devereaux, Tracy Jo (DEQ)
> **Sent:** Friday, May 08, 2015 8:22 AM
> **To:** Philip, Kris (DEQ); Benzie, Richard (DEQ)
> **Cc:** Shekter Smith, Liane (DEQ)
> **Subject:** FW: Ticket #23002-490657 Response Sent
>
> fyi
>
> Thanks,
> *Tracy Jo*
>
> ---
>
> **From:** Smith, Laura (DEQ)
> **Sent:** Thursday, May 07, 2015 5:39 PM
> **To:** Devereaux, Tracy Jo (DEQ)
> **Cc:** Hill, Charles (DEQ); Selden, Barry (DEQ)
> **Subject:** FW: Ticket #23002-490657 Response Sent
>
> Please forward to the appropriate staff in the Office of Drinking Water and Municipal Assistance.

Thanks,
Laura

From: Sheila Bailey-Waddell [mailto:sheila.bw@hotmail.com]
Sent: Thursday, May 07, 2015 5:17 PM
To: Hill, Charles (DEQ); Selden, Barry (DEQ); Smith, Laura (DEQ)
Subject: FW: Ticket #23002-490657 Response Sent

From: sheila.bw@hotmail.com
To: safewater_support@supportportal.com; bartholi@msu.edu; info@cityofflint.com; senator@stabenow.senate.gov; bennettc4@michigan.gov
Subject: RE: Ticket #23002-490657 Response Sent
Date: Thu, 7 May 2015 16:41:38 -0400

Hello,

It is unfortunate that you don't track local drinking water information. So in essence your tracking efforts are limited to the auspices of NRCS Water Division only for the conservation of farming and other natural (non-human) resources. What if, by chance, the local water source is not being accurate in their reporting of safe drinking water and source supply?

Thank you,
Sheila

http://mi.water.usgs.gov/pubs/MISC/RTSMI-0121/pdf/WTO222b.pdf

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From: safewater_support@supportportal.com
To: sheila.bw@hotmail.com
Date: Thu, 20 Feb 2014 08:25:04 -0500
Subject: Ticket #23002-490657 Response Sent

The Safe Drinking Water Hotline has responded to your question(s).
Hello,
Thank you for contacting the Safe Drinking Water Hotline. You had some concerns regarding your local water quality. Please review the information included below:
The Safe Drinking Water Hotline does not track local drinking water information. The best source of specific information about your drinking water is your water supplier. Water suppliers that serve the same people year-round are required to send their customers an annual water quality report called a Consumer Confidence Report (CCR). The CCR describes any contaminants that have been detected in your drinking water, how these detection levels compare to health-based national drinking water standards, and the source of your drinking water. To obtain a copy of your CCR, you may search online at http://cfpub.epa.gov/safewater/ccr/index.cfm. If your water system's report is not online, you should contact your local water provider to obtain

a copy of this report. To find the telephone number for your local water provider, please check your water utility bill, your local phone book, or search online at http://cfpub.epa.gov/safewater/ccr/index.cfm.

If your city has a population in excess of 100,000, they are obligated to publish the reports online. Many local governments have sites where reports can be posted, even if a system itself does not have a site. EPA will make links from its Web site (http://water.epa.gov/drink/index.cfm) to all the reports of which it is aware (Preparing Your Drinking Water Consumer Confidence Report: Revised Guidance for Community Water Suppliers), EPA816-R-05-002).

If your city has not made the 2012 report available, please contact your state water program. They are the regulatory and enforcement agency for all public water systems in your state. The state water program should help you find the data. You can find contact information to your state by following the link below:

http://water.epa.gov/drink/local/index.cfm.http://cfpub.epa.gov/safewater/ccr/index.cfm.

EPA's Safe Drinking Water Hotline answers questions about the regulations and programs developed in response to the Safe Drinking Water Act. The Safe Drinking Water Hotline provides information, including access to publications, on EPA's drinking water standards, source water protection, and underground injection wells. The Hotline also provides referrals to state public water supply supervision programs, state underground injection control programs, and state laboratory certification programs.

If you have additional questions, you may contact the Safe Drinking Water Hotline at the following number:

(800) 426-4791 -- Toll Free

For more information, please visit EPA's Office of Ground Water and Drinking Water Internet web site:

http://water.epa.gov/drink/index.cfm.

Thank you for your interest in safe drinking water.

Ticket Information:

Ticket #:	23002-490657
Date Created:	2/19/2014 02:18 PM EST
Subject:	Water Quality Assessment
Question:	I live in Flint Michigan. What I have learned is Michigan appears to have 2012 and 2014 reports but neither are being reported by EPA. On this side of reporting for this data, we have no information as to the status of the 2012 or 2014 data. There are automotive plants in my area and the water quality is suspected to be less than satisfactory for residents.

To update or check the status of this Ticket:

1. Go to: http://safewater.supportportal.com/link/portal/23002/23015/Ticket/490657
2. Log in, and you will be automatically taken to the Ticket page.

Prysby, Mike (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Thursday, April 09, 2015 7:52 AM
To: Prysby, Mike (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: RE: Flint River Monitoring

Oh, that's good. Thank you! I put the letter in Tom P.'s box, but I'll revise it now before he gets in.
You both are terrific to work with; did I tell you that?
Jennifer

From: Prysby, Mike (DEQ) [mailto:PRYSBYM@michigan.gov]
Sent: Thursday, April 09, 2015 6:46 AM
To: Crooks, Jennifer
Cc: Busch, Stephen (DEQ)
Subject: RE: Flint River Monitoring

Jennifer,

This reads well...You may want to add to the two last sentences...."To clarify, the TTHMs found in the city's drinking water are a by-product of the chlorination process which starts at the water treatment plant as chlorine reacts with naturally occurring organic compounds from the Flint River". "Refrigerants and solvents are not the contributing precursors of TTHM formation from the Flint River".

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

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Wednesday, April 08, 2015 4:30 PM
To: Busch, Stephen (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: RE: Flint River Monitoring

How does this sound?

"Your letter indicated that you received a letter of alert regarding refrigerant and cleaning solvents found in the Flint River. The letter of alert is most likely the public notice dated January 2, 2015 that was sent to you by the City regarding the drinking water TTHM violation, as required by Federal and SDWAs. Wikipedia states that industrial uses of TTHMs are refrigerants and solvents, and that TTHMs as water pollutants are a by-product of the chlorination process. To clarify, the TTHMs found in the City's drinking water are a by-product of the chlorination process which begins in the City's water treatment plant. The TTHMs are not originating from the Flint River."

Jen

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Wednesday, April 08, 2015 2:33 PM
To: Crooks, Jennifer
Cc: Prysby, Mike (DEQ)
Subject: RE: Flint River Monitoring

Jennifer,

Here is what we think your complainant may be referring to:

The solvent/refrigerant reference appears to come from Wikipedia
http://en.wikipedia.org/wiki/Trihalomethane

The Flint Public Notice was mailed out to residents on January 2, 2015.
http://www.mlive.com/news/flint/index.ssf/2015/01/flint_water_has_high_disinfect.html

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

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Wednesday, April 08, 2015 3:02 PM
To: Busch, Stephen (DEQ)
Cc: Prysby, Mike (DEQ)
Subject: RE: Flint River Monitoring

Thank you, Steve, for such a prompt answer—I definitely appreciate it. So, I thought I would respond below—is this accurate in your opinion?

"Your letter indicated that you received a letter of alert regarding refrigerant and cleaning solvents found in the Flint River. Three different programs in the Water Resources Division were contacted, and none were aware of any reports of dumping of these chemicals, nor of any monitoring being done on the Flint River for these chemicals."

Jennifer

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Wednesday, April 08, 2015 1:06 PM
To: Crooks, Jennifer
Cc: Prysby, Mike (DEQ)
Subject: Flint River Monitoring

Jennifer,

Per our phone conversation this morning, I have contacted MDEQ Water Resources Division Staff. This included:
Stephanie Kammer, Acting Lansing District Supervisor
Chuck Bennett, NPDES and Wastewater Engineering

William Keiper, Aquatic Biologist, Surface Water Assessment Section
Susan Doty, Storm Water NPDES and Non-point Source

All responded and none of them are aware of such monitoring (solvents or refrigerants) being done on the Flint River.

Please let me know if you end up with a copy of this "Letter of Alert" from your complainant. I'm sure we would all be interested in the source of such information.

Thanks.

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

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, April 03, 2015 6:14 PM
To: Sheila Bailey-Waddell
Subject: Re: City of Flint Water

Sheila,
I was not aware of the sewage discharge since I don't reside in Genesee County and I don't work in the waste water program. I appreciate you bringing it to my attention. The sewage discharge occurred in the city of Flushing and is approximately 20 miles downstream of the Flint Water Treatment river intake; thus the treatment and Flint's water supply was not threatened by this particular discharge. I will follow up with you further on Monday concerning the cost of water.

Sent from my iPhone

On Apr 3, 2015, at 4:34 PM, Sheila Bailey-Waddell <sheila.bw@hotmail.com> wrote:

> Michael,
>
> I refuse to believe that you were unaware of this incident. I have provided a link below for your reference and that you were informed. Although you have stated that you do not regulate the rates, there, perhaps, is an indirect relationship with Michigan DEQ components and rates charged (i.e revolving funds, loans, etc...). Somewhere in your agency's organization structure these two elements must cross.
>
> http://www.mlive.com/news/flint/index.ssf/2015/04/flushing_discharges_nearly_100.html
>
> Thank you,
> Sheila

From: PRYSBYM@michigan.gov
To: sheila.bw@hotmail.com
Subject: City of Flint Water
Date: Fri, 3 Apr 2015 19:57:28 +0000

Sheila,

To better help address your first concern pertaining to the spill of sewage into the Flint, I will need to know the location of the spill and when it occurred. Your second concern, pertaining to the high cost of water cannot be answered by our department since we do not regulate how a water utility charges its customers. It is the city's obligation, as part of building good public relations and perception, to provide an informative response to customers concerned over high water rates.

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

MDEQ

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, April 03, 2015 3:28 PM
To: deq-assist
Subject: RE: Email Inquiry

Kristen,

I need to know the location of the sewage spill into the Flint River before I can respond to Sheila. The second part of her complaint focuses on the cost of water service of which it is the city's obligation to provide an informative response.

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

From: deq-assist
Sent: Friday, April 03, 2015 3:09 PM
To: Prysby, Mike (DEQ)
Subject: FW: Email Inquiry

Good Afternoon,

Mike,

Would you be able to follow up with Sheila regarding her concerns.

Thank you.

Kristin Barger
Office of Environmental Assistance
Dept. of Environmental Quality
PO Box 30457
Lansing, MI 48909
800-662-9278 or 517-284-6853

Please take a moment to provide feedback regarding the service you received: (https://www.surveymonkey.com/s/oeacs)

From: DoNotReply@michigan.gov [mailto:DoNotReply@michigan.gov]
Sent: Friday, April 03, 2015 2:52 PM

To: deq-assist
Subject: Email Inquiry

CompanyName:
FirstName: Sheila
LastName:
Email: sheila.bw@hotmail.com
DayPhone: 810-259-3056
AltPhone:
Address:
City:
State:
ZipCode:
County: Genesee
YourMessage: It is learned that there was an EPA violation regarding water quality in the City of Flint in May of 2014. What concerns me, even more, is that there was spillage of sewage into the Flint River. Still, to this date, our water quality is, I ascertain, worse than it was before the violation; resulting in all types of illnesses and dermatological problems. Finally, I want to know why rates have increased at least 300%. It is harmful to the health of the residents. What are you guys trying to do? Kill us and charge us for dying? You then give them a slap on the risk for the violations. It seems to me that the residents are paying the loans of the revolving fund with the excessive rate charges. Something in water is not right and it's not just the water.

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, March 19, 2015 11:28 AM
To: Bennett, Charles (DEQ); Thomas Hutchings (thutchings@cityofflint.com)
Cc: Kammer, Stephanie (DEQ); Case, Robert; Busch, Stephen (DEQ); 'bwright@cityofflint.com'
Subject: RE: PEAS call

Brent investigated the PEAS call and left me a voicemail with his findings. He confirmed that the residue was a previous lime sludge leak and frozen residue still needs to be cleaned up. The source of the sheen was from a previous storm sewer discharge; however, there was no storm sewer discharge this morning and conditions appeared clear. Brent also followed up with the concerned citizen. Brent will provide further follow-up (via e-mail) concerning this PEAS call.

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

From: Bennett, Charles (DEQ)
Sent: Thursday, March 19, 2015 10:10 AM
To: Thomas Hutchings (thutchings@cityofflint.com)
Cc: Kammer, Stephanie (DEQ); Prysby, Mike (DEQ); Case, Robert; Busch, Stephen (DEQ)
Subject: PEAS call

Tom, I just spoke with a gentleman that reported a discharge to the Flint River south of Carpenter Rd at Bray. The complainant stated that the material is whitish and may have a sheen also. He said it looks like crews have done some excavating along the bike path near this discharge. Attached are photos that I received a moment ago from the caller.

Also, you may want to contact Brent Wright about this matter as well, since our Drinking Water engineer has contacted him about this also (see attachment). Please let me know what you find.

thanks,
chuck

Charles Bennett, PE
DEQ Water Resources Division
Lansing District Office
BennettC4@michigan.gov
ph 517-284-6659; fax 517-241-3571

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, March 19, 2015 10:03 AM
To: Rennaker, Joanne (DEQ); Blayer, Steve (DEQ); Arduin, Jim (DEQ)
Cc: Busch, Stephen (DEQ); Bennett, Charles (DEQ)
Subject: RE: WRD - PEAS - Oil Sheen

I notified the city – Brent Wright (WTP OIC) of the situation given that this just upstream of their WTP intake. Brent and his staff will go out to investigate. Based on past history, he is speculating that it is a break in their lime sludge line. This line is located close to the Flint River in this area and has experienced breaks in the past. I also provided Brent with the caller's name and suggested to contact him and let him know that the city is following up on this incident.

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

From: Rennaker, Joanne (DEQ)
Sent: Thursday, March 19, 2015 9:05 AM
To: Prysby, Mike (DEQ); Blayer, Steve (DEQ); Arduin, Jim (DEQ)
Subject: FW: WRD - PEAS - Oil Sheen

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

From: Jesko, Roxanne (DEQ)
Sent: Thursday, March 19, 2015 9:02 AM
To: Gutting, Karen (DEQ); DEQ-PEAS-Lansing
Cc: Bennett, Charles (DEQ)
Subject: RE: WRD - PEAS - Oil Sheen

WRD has it Chuck Bennett will be the lead.

From: Gutting, Karen (DEQ)
Sent: Thursday, March 19, 2015 8:44 AM
To: DEQ-PEAS-Lansing
Subject: WRD - PEAS - Oil Sheen
Importance: High

PEAS Form 2014			revised July 23,

First Response please "Reply All" to receipt of this PEAS Notification ASAP.
Media: Water
County: Genesee
Ticket # 1498

Incident Description: There is a sanitary sewer that runs parallel with the Flint river that has had several line breaks. This is causing a sheen on the water. Some of this has solidified along the river bank and is white in color. This is approximately ¼ mile down the bike trail where Bray Rd. ends S of Carpenter. Whatever is coming out of the line, is coming out steady. Caller has photos if needed.

Complainant (C)		**Party Involved (PI) – Company**	
Name	James Joseph	Person Name	
Street Address		Company Name	
City or Township		Street Address	
State		City or Township	
Phone	810-820-5526	State	
Alt Phone		Phone	
Type		Alternate Phone	
Incident Street Address	S. of Carpenter and Bray Rd (where Bray Rd. stops and now it's a bike path)		
Cross Streets		**Name of Pollutant**	unsure
City or Township	Flint	Release to **Water** (g)	unknown
County		Release to **Ground** (g)	
Water Body Impacted	Flint River	Release to **Air** (lbs)	
Occurred: Date/Time/Ongoing	unsure	**Cleanup Contractor**	
Release Secured: Y or N		**Cleanup Contractor on site: Y or N**	

Comments:

Karen Gutting
Department of Environmental Quality
Office of Environmental Assistance
Environmental Assistance Center
800-662-9278

Prysby, Mike (DEQ)

From:	Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent:	Tuesday, February 24, 2015 12:55 PM
To:	Busch, Stephen (DEQ); Prysby, Mike (DEQ); Benzie, Richard (DEQ)
Cc:	Shekter Smith, Liane (DEQ)
Subject:	FYI: Flint Michigan control 2-20-15
Attachments:	Flint Michigan Control 22015.pdf

You'll receive a hard copy, too.
Jen

From: Sulej, Erik
Sent: Friday, February 20, 2015 12:34 PM
To: Crooks, Jennifer; Murphy, Thomas
Subject: Flint Michigan control 2-20-15

Here is a copy for your records. Everything went out today.

Have great weekend!

Erik S. Sulej
Ground Water and Drinking Water Branch
U.S. Environmental Protection Agency, Region 5
77 W. Jackson Blvd (WG-15J), Chicago, IL 60604
Phone: (312) 886-3473 / Email: sulej.erik@epa.gov

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

JUL 2 2 2015

REPLY TO THE ATTENTION OF: WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
JUL 28 2015
LANSING DISTRICT

Mr. Jacob Wade Peel
3818 Augusta Street
Flint, Michigan 48532

Dear Mr. Peel:

Thank you for your May 15, 2015 email to President Obama concerning the drinking water quality in the City of Flint, Michigan. Your letter was forwarded to me for a response since Michigan is located in Region 5 of the U.S. EPA.

My staff contacted the Michigan Department of Environmental Quality (MDEQ) Lansing District Supervisor, Steve Busch, to discuss Flint's drinking water issues. He and his staff continue to work closely with Flint's Water Department to ensure the non-compliance issues associated with *E. coli* and trihalomethanes (TTHM) experienced by Flint have been addressed. Flint has returned the bacteria maximum contaminant level (MCL) violations that occurred in August and September 2014 to compliance.

Compliance with the TTHM health standard is based upon the average of one year of sample data, from the most recent four quarters, at each sampling location. Flint implemented operational techniques at the drinking water treatment plant and in the distribution system to reduce the formation of TTHM compounds. Flint's actions have reduced TTHM concentrations to the point where the most recent results (May 2015) at all eight sample locations are below the drinking water TTHM health standard. Due to the exceedances in 2014, Flint must continue to provide quarterly public notification of TTHM concentrations. Flint continues to work with the MDEQ engineers to maintain the reduced TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

While the Safe Drinking Water Act (SDWA) regulates drinking water to ensure it meets health standards, U.S. EPA does not regulate how utilities operate administratively. Treating, storing and distributing drinking water from a lake or river source that meets SDWA requirements has significant cost, thus it is the responsibility of the water supply to set an appropriate water rate

structure to fund existing and future costs to operate and maintain the water supply. However, the U.S. EPA has no authority in the decisions concerning setting of user charges. This is a local jurisdictional issue.

The Michigan Department of Treasury conducts annual financial audits of local units of government in accordance with U.S. government auditing standards and Michigan Public Act 34 of 2001, the Municipal Finance Act. This includes Flint and its proprietary utility funds. While these audits do not set the rate structure, they do ensure that funds generated through water rates are accounted and directed in accordance with applicable laws.

Copies of these audits can be obtained online at the following location:

https://treas-secure.state.mi.us/LAFDocSearch/

There is currently no Federal regulatory oversight of water utility rates in Michigan.

Telephone numbers for citizens to call if they have further concerns about their drinking water quality or if citizens would like their drinking water tested by Flint:

Flint Water Service Center deals with problems in the distribution system: (810) 766-7202

Flint Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: (810) 787-6537

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Kris Donaldson, MDEQ
Kris Philip, MDEQ
Richard Benzie, MDEQ

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

JUN 23 2015

REPLY TO THE ATTENTION OF:
WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 29 2015
LANSING DISTRICT

Ms. Michelle R. George
7719 Prairie Street
Detroit, Michigan 48210

Dear Ms. George:

Thank you for your June 1, 2015 letter to Ken Kopocis, Deputy Assistant Administrator, U.S. Environmental Protection Agency (U.S. EPA), concerning drinking water quality in the cities of Detroit, Flint, and Highland Park, Michigan. Your letter was forwarded to me for a response since Michigan is located in Region 5 of the U.S. EPA.

My staff contacted the Michigan Department of Environmental Quality (MDEQ) District Supervisor for the Southeast Michigan District, Kris Donaldson, to discuss the Detroit shut-off of water service to Detroit citizens, and the possibility of Detroit shutting off water service to Highland Park. Highland Park has had problems with its billing process for a number of years. At this time, the Great Lakes Regional Authority/Detroit has not shut-off water service to Highland Park.

Ms. Donaldson can provide you with a status of the various negotiations/contracts currently underway between the Great Lakes Regional Authority and the City of Detroit, which includes water service to Highland Park. You can contact Ms. Donaldson at:

Kris Donaldson, P.E., District Supervisor
Southeast Michigan District
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
27700 Donald Court
Warren, Michigan 48092
(586) 753-3759
donaldsonk@michigan.gov

Under the Federal Safe Drinking Water Act (SDWA), public water supplies must meet standards developed under the SDWA. Non-compliance may result in enforcement by the MDEQ or U.S. EPA.

While the SDWA regulates drinking water to ensure it meets health standards, U.S. EPA does not regulate how utilities operate administratively. Treating, storing and distributing drinking water from a lake or river source that meets SDWA requirements has significant cost, thus it is the responsibility of the water supply to set an appropriate water rate structure to fund existing and future costs to operate and maintain the water supply. However, U.S. EPA has no authority

in the decisions concerning setting of user charges or shutting off water service to customers. These are local jurisdictional issues. There is currently no Federal regulatory oversight of water utility rates in Michigan.

My staff also contacted the MDEQ Lansing District Supervisor, Steve Busch, to discuss Flint's drinking water issues. He and his staff continue to work closely with Flint's Water Department to ensure the non-compliance issues associated with *E. coli* and trihalomethanes (TTHM) experienced by Flint have been addressed. Flint has returned the bacteria MCL violations that occurred in August and September 2014 to compliance.

Compliance with the TTHM health standard is based upon the average of one year of sample data, from the most recent four quarters, at each sampling location. Flint implemented operational techniques at the drinking water treatment plant and in the distribution system to reduce the formation of TTHM compounds. Flint's actions have reduced TTHM concentrations to the point where the most recent results (May 2015) at all eight sample locations are below the drinking water TTHM health standard. Due to the exceedances in 2014, Flint must continue to provide quarterly public notification of TTHM concentrations. Flint continues to work with the MDEQ engineers to maintain the reduced TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Kris Donaldson, MDEQ
Kris Philip, MDEQ
Richard Benzie, MDEQ

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

MAR 16 2015

REPLY TO THE ATTENTION OF:
WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 23 2015
LANSING DISTRICT

Ms. Janet Poole-Little
2742 Thomas Street
Flint, Michigan 48504

Dear Ms. Poole-Little:

Thank you for your January 23, 2015 e-mail to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your e-mail was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To summarize the background of your concerns with the City of Flint's drinking water, the source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron, and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the City of Flint's Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. The City of Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

My staff contacted the MDEQ District Supervisor for the Lansing District, Steve Busch, to discuss the City of Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with the City of Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. Since April 2014, the City of Flint has been issued violations of total coliform and *E. coli* bacteria health standards, and Total Trihalomethanes (TTHM); all other regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts. It is true that the City of Flint exceeded the health standards for *E. coli* in August 2014, for total coliform bacteria in September 2014, and TTHMs in the fourth quarter of 2014. The City of Flint conducted the proper follow-up to these violations as required by Federal and State regulations. The City of Flint has returned to compliance the two bacteria MCL violations that occurred in August and September 2014.

Compliance with the TTHM health standard is based upon the average of one year of sample data, from the most recent four quarters, at each sampling location. The initial monitoring in early summer 2014 reported elevated levels of TTHM compounds throughout the City's distribution system. The MDEQ's Lansing District office advised the City that it needed to immediately implement operational techniques at the drinking water treatment plant and in the

distribution system to reduce the formation of TTHM compounds. The City of Flint's actions have reduced TTHM concentrations to the point where the most recent results at all eight sample locations are below the drinking water TTHM health standard. Due to the past exceedance, the City must continue to provide quarterly public notification of TTHM concentrations. The City continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

Some residents have suggested that the source of drinking water should be switched back to Detroit drinking water which comes from Lake Huron. EPA does not have the authority to require the City to change its source of drinking water back to Detroit drinking water. The decision to change the source of the City of Flint's drinking water was a local decision, and continues to be a local decision only. However, the City is obligated to take actions necessary to meet drinking water standards.

In your e-mail, you noted concerns regarding the health effects of TTHMs. By law, the City must inform consumers of health standard exceedances. The risk of developing long-term health problems from TTHM exposure is low for those in general good health and can be a concern after years of ingestion. The risk of developing health problems is higher for some sub-populations, such as the immune-compromised and pregnant women; therefore, this group may want to seek alternative sources of water, such as bottled water, or purchase a home water treatment device. Consumers may want to talk with their doctors to help them make individual health decisions.

Your e-mail also noted a concern regarding the high cost for drinking water. A part of the water rate is based upon the amount of water the resident is using; however, the base rate/service charge includes debt service charges and operation and maintenance costs of the water supply. The Michigan Department of Treasury conducts annual financial audits of local units of government in accordance with U.S. government auditing standards and Michigan Public Act 34 of 2001, the Municipal Finance Act. This includes the City of Flint and its proprietary utility funds. While these audits do not set the rate structure, they do ensure that funds generated through water rates are accounted and directed in accordance with applicable laws.

Copies of these audits can be obtained online at the following location:

https://treas-secure.state.mi.us/LAFDocSearch/

There is currently no Federal regulatory oversight of water utility rates in Michigan.

Telephone numbers for you to call if you have further concerns about your drinking water quality:

Flint Water Service Center deals with problems in the distribution system: (810) 766-7202

Flint Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: (810) 787-6537

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

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

MAR 0 2 2015

REPLY TO THE ATTENTION OF:
WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION

MAR 05 2015

LANSING DISTRICT

Ms. Ashley Conner
3923 Blackington Avenue
Flint, Michigan 48532

Dear Ms. Conner:

Thank you for your January 13, 2015 email to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your email was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To summarize the background of your concerns with the City of Flint's drinking water, the source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron; and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the City of Flint's Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. The City of Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

My staff contacted the MDEQ District Supervisor for the Lansing District, Steve Busch, to discuss the City of Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with the City of Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. The most recent laboratory analyses obtained from MDEQ of the City of Flint's drinking water indicate that almost all regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts. It is true that the City of Flint exceeded the maximum contaminant levels (MCL) for *E. coli* in August 2014, for total coliform bacteria in September 2014, and total trihalomethanes (TTHM) in the fourth quarter of 2014. The City of Flint conducted the proper follow-up to these violations as required by Federal and State regulations. The City of Flint has returned to compliance the two bacteria MCL violations that occurred in August and September 2014.

The TTHM violation is based upon the average of data from four quarters for each sampling location. The initial monitoring in early summer reported significantly elevated levels of TTHM compounds throughout the City's distribution system. The MDEQ's Lansing District office advised the City that it needed to immediately implement operational techniques at the drinking

water treatment plant and in the distribution system to reduce the formation of TTHM compounds. The City of Flint's actions have reduced TTHM concentrations to the point where the most recent results at seven of the eight sample locations are below the drinking water TTHM health standard. At this time, the City must continue to provide quarterly public notification, as it continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

Some residents have suggested that the source of drinking water should be switched back to Detroit drinking water which comes from Lake Huron. Unfortunately, EPA does not have the authority to require the City to change its source of drinking water back to Detroit drinking water. The decision to change the source of the City of Flint's drinking water was a local decision, and continues to be a local decision only.

Your email also stated that you are paying high monthly bills for drinking water. A part of the water rate is based upon the amount of water the resident is using; however, the base rate/service charge includes debt service charges and operation and maintenance costs of the water supply. The Michigan Department of Treasury conducts annual financial audits of local units of government in accordance with U.S. government auditing standards and Michigan Public Act 34 of 2001, the Municipal Finance Act. This includes the City of Flint and its proprietary utility funds. While these audits do not set the rate structure, they do ensure that funds generated through water rates are accounted and directed in accordance with applicable laws.

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Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: (810) 787-6537

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

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

MAR 0 2 2015

REPLY TO THE ATTENTION OF:
WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION

MAR 05 2015

LANSING DISTRICT

Ms. Ashley Conner
3923 Blackington Avenue
Flint, Michigan 48532

Dear Ms. Conner:

Thank you for your January 13, 2015 email to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your email was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To summarize the background of your concerns with the City of Flint's drinking water, the source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron; and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the City of Flint's Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. The City of Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

My staff contacted the MDEQ District Supervisor for the Lansing District, Steve Busch, to discuss the City of Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with the City of Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. The most recent laboratory analyses obtained from MDEQ of the City of Flint's drinking water indicate that almost all regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts. It is true that the City of Flint exceeded the maximum contaminant levels (MCL) for *E. coli* in August 2014, for total coliform bacteria in September 2014, and total trihalomethanes (TTHM) in the fourth quarter of 2014. The City of Flint conducted the proper follow-up to these violations as required by Federal and State regulations. The City of Flint has returned to compliance the two bacteria MCL violations that occurred in August and September 2014.

The TTHM violation is based upon the average of data from four quarters for each sampling location. The initial monitoring in early summer reported significantly elevated levels of TTHM compounds throughout the City's distribution system. The MDEQ's Lansing District office advised the City that it needed to immediately implement operational techniques at the drinking

water treatment plant and in the distribution system to reduce the formation of TTHM compounds. The City of Flint's actions have reduced TTHM concentrations to the point where the most recent results at seven of the eight sample locations are below the drinking water TTHM health standard. At this time, the City must continue to provide quarterly public notification, as it continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

Some residents have suggested that the source of drinking water should be switched back to Detroit drinking water which comes from Lake Huron. Unfortunately, EPA does not have the authority to require the City to change its source of drinking water back to Detroit drinking water. The decision to change the source of the City of Flint's drinking water was a local decision, and continues to be a local decision only.

Your email also stated that you are paying high monthly bills for drinking water. A part of the water rate is based upon the amount of water the resident is using; however, the base rate/service charge includes debt service charges and operation and maintenance costs of the water supply. The Michigan Department of Treasury conducts annual financial audits of local units of government in accordance with U.S. government auditing standards and Michigan Public Act 34 of 2001, the Municipal Finance Act. This includes the City of Flint and its proprietary utility funds. While these audits do not set the rate structure, they do ensure that funds generated through water rates are accounted and directed in accordance with applicable laws.

Copies of these audits can be obtained online at the following location:

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There is currently no Federal regulatory oversight of water utility rates in Michigan.

Telephone numbers for you to call if you have further concerns about your drinking water quality:

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We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

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

MAR 0 6 2015

REPLY TO THE ATTENTION OF:

WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION

MAR 12 2015

LANSING DISTRICT

Ms. Pamela Williams
3218 Beecher Road
Flint, Michigan 48503

Dear Ms. Williams:

Thank you for your January 27, 2015 email to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your email was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To summarize the background of your concerns with the City of Flint's drinking water, the source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron; and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the City of Flint's Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. The City of Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

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The TTHM violation is based upon the average of data from the most recent four quarters for each sampling location. The initial monitoring in early summer 2014 reported significantly elevated levels of TTHM compounds throughout the City's distribution system. The MDEQ's Lansing District office advised the City that it needed to immediately implement operational techniques at the drinking water treatment plant and in the distribution system to reduce the

formation of TTHM compounds. The City of Flint's actions have reduced TTHM concentrations to the point where the most recent results at all eight sample locations are below the drinking water TTHM health standard. At this time, the City must continue to provide quarterly public notification, because the annual average continues to be above the TTHM health standard. The City continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

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Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

18

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

MAR 0 6 2015

REPLY TO THE ATTENTION OF:

WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 13 2015
LANSING DISTRICT

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Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

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

MAR 16 2015

REPLY TO THE ATTENTION OF:

WG-15J

Ms. Caroline Kreitz
1734 Pennsylvania Avenue, Apt. 1
Flint, Michigan 48506

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 23 2015
LANSING DISTRICT

Dear Ms. Kreitz:

Thank you for your January 23, 2015 e-mail to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your e-mail was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

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Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAR 16 2015

REPLY TO THE ATTENTION OF:

WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 23 2015
LANSING DISTRICT

Mr. Cody Ance
1738 Indiana Avenue
Flint, Michigan 48506

Dear Mr. Ance:

Thank you for your February 10, 2015 e-mail to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your e-mail was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

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In your e-mail, you noted concerns regarding the health effects of TTHMs. By law, the City must inform consumers of health standard exceedances. The risk of developing long-term health problems from TTHM exposure is low for those in general good health and can be a concern after years of ingestion. The risk of developing health problems is higher for some sub-populations, such as the immune-compromised and pregnant women; therefore, this group may want to seek alternative sources of water, such as bottled water, or purchase a home water treatment device. Consumers may want to talk with their doctors to help them make individual health decisions.

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Director, Water Division

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Richard Benzie, MDEQ

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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CHICAGO, IL 60604-3590

MAR 16 2015

REPLY TO THE ATTENTION OF:
WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
MAR 23 2015
LANSING DISTRICT

Ms. Janet Poole-Little
2742 Thomas Street
Flint, Michigan 48504

Dear Ms. Poole-Little:

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MAR 16 2015

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MAR 23 2015
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To summarize the background of your concerns with the City of Flint's drinking water, the source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron, and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the City of Flint's Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. The City of Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

My staff contacted the MDEQ District Supervisor for the Lansing District, Steve Busch, to discuss the City of Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with the City of Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. Since April 2014, the City of Flint has been issued violations of total coliform and *E. coli* bacteria health standards, and Total Trihalomethanes (TTHM); all other regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts. It is true that the City of Flint exceeded the health standards for *E. coli* in August 2014, for total coliform bacteria in September 2014, and TTHMs in the fourth quarter of 2014. The City of Flint conducted the proper follow-up to these violations as required by Federal and State regulations. The City of Flint has returned to compliance the two bacteria MCL violations that occurred in August and September 2014.

Compliance with the TTHM health standard is based upon the average of one year of sample data, from the most recent four quarters, at each sampling location. The initial monitoring in early summer 2014 reported elevated levels of TTHM compounds throughout the City's distribution system. The MDEQ's Lansing District office advised the City that it needed to immediately implement operational techniques at the drinking water treatment plant and in the

distribution system to reduce the formation of TTHM compounds. The City of Flint's actions have reduced TTHM concentrations to the point where the most recent results at all eight sample locations are below the drinking water TTHM health standard. Due to the past exceedance, the City must continue to provide quarterly public notification of TTHM concentrations. The City continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

Some residents have suggested that the source of drinking water should be switched back to Detroit drinking water which comes from Lake Huron. EPA does not have the authority to require the City to change its source of drinking water back to Detroit drinking water. The decision to change the source of the City of Flint's drinking water was a local decision, and continues to be a local decision only. However, the City is obligated to take actions necessary to meet drinking water standards.

In your e-mail, you noted concerns regarding the health effects of TTHMs. By law, the City must inform consumers of health standard exceedances. The risk of developing long-term health problems from TTHM exposure is low for those in general good health and can be a concern after years of ingestion. The risk of developing health problems is higher for some sub-populations, such as the immune-compromised and pregnant women; therefore, this group may want to seek alternative sources of water, such as bottled water, or purchase a home water treatment device. Consumers may want to talk with their doctors to help them make individual health decisions.

Your e-mail also noted a concern regarding the high cost for drinking water. A part of the water rate is based upon the amount of water the resident is using; however, the base rate/service charge includes debt service charges and operation and maintenance costs of the water supply. The Michigan Department of Treasury conducts annual financial audits of local units of government in accordance with U.S. government auditing standards and Michigan Public Act 34 of 2001, the Municipal Finance Act. This includes the City of Flint and its proprietary utility funds. While these audits do not set the rate structure, they do ensure that funds generated through water rates are accounted and directed in accordance with applicable laws.

Copies of these audits can be obtained online at the following location:

https://treas-secure.state.mi.us/LAFDocSearch/

There is currently no Federal regulatory oversight of water utility rates in Michigan.

Telephone numbers for you to call if you have further concerns about your drinking water quality:

Flint Water Service Center deals with problems in the distribution system: (810) 766-7202

Flint Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: (810) 787-6537

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

155

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

MAR 16 2015

REPLY TO THE ATTENTION OF:

WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION

MAR 23 2015

LANSING DISTRICT

Ms. Caroline Kreitz
1734 Pennsylvania Avenue, Apt. 1
Flint, Michigan 48506

Dear Ms. Kreitz:

Thank you for your January 23, 2015 e-mail to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your e-mail was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To summarize the background of your concerns with the City of Flint's drinking water, the source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron; and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the City of Flint's Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. The City of Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

My staff contacted the MDEQ District Supervisor for the Lansing District, Steve Busch, to discuss the City of Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with the City of Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. Since April 2014, the City of Flint has been issued violations of total coliform and *E. coli* bacteria health standards, and Total Trihalomethanes (TTHM); all other regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts. It is true that the City of Flint exceeded the health standards for *E. coli* in August 2014, for total coliform bacteria in September 2014, and TTHMs in the fourth quarter of 2014. The City of Flint conducted the proper follow-up to these violations as required by Federal and State regulations. The City of Flint has returned to compliance the two bacteria violations that occurred in August and September 2014.

Compliance with the TTHM health standard is based upon the average of one year of sample data, from the most recent four quarters, at each sampling location. The initial monitoring in early summer 2014 reported elevated levels of TTHM compounds throughout the City's distribution system. The MDEQ's Lansing District office advised the City that it needed to immediately implement operational techniques at the drinking water treatment plant and in the

distribution system to reduce the formation of TTHM compounds. The City of Flint's actions have reduced TTHM concentrations to the point where the most recent results at all eight sample locations are below the drinking water TTHM health standard. Due to the past exceedance, the City must continue to provide quarterly public notification of TTHM concentrations. The City continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its drinking water quality, you can contact Mr. Busch at:

Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

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We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

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

REPLY TO THE ATTENTION OF:

APR 15 2015

WG-15J

Mr. John D. Durand
1008 Woodside Drive
Flint, Michigan 48503

DEQ
RESOURCE MANAGEMENT DIVISION
APR 20 2015
LANSING DISTRICT

Dear Mr. Durand:

Thank you for your January 13, 2015 letter to President Obama concerning the quality of the drinking water in the City of Flint, Michigan (Flint). Your letter was forwarded to me for a response, since Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To respond to your letter, my staff contacted the Michigan Department of Environmental Quality (MDEQ) District Supervisor for the Lansing District, Steve Busch, to discuss Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. Since April 2014, Flint exceeded the health standards for *E. coli* in August 2014, for total coliform bacteria in September 2014, and TTHMs in the fourth quarter of 2014; all other regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts (SDWA). Flint conducted the proper follow-up to the above violations as required by Federal and State regulations. Flint has returned to compliance the bacteria MCL violations that occurred in August and September 2014.

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Your letter indicated that you received a letter of alert regarding refrigerant and cleaning solvents found in the Flint River. We believe the letter of alert to be the public notice dated January 2, 2015 that was sent to you by Flint regarding the drinking water TTHM violation, as required by Federal and State SDWAs; however it did not reference refrigerant and cleaning solvents. To clarify, the TTHMs found in Flint's drinking water are a by-product of the chlorination process which begins at the Flint water treatment plant as chlorine reacts with naturally occurring organic compounds from the Flint River. Refrigerants and solvents are not the contributing organic compounds of TTHM formation found in Flint drinking water.

Additional information is enclosed for your information.

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

Additional Information April 2015

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155

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

REPLY TO THE ATTENTION OF:

APR 15 2015

WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
APR 21 2015
LANSING DISTRICT

Mr. John D. Durand
1008 Woodside Drive
Flint, Michigan 48503

Dear Mr. Durand:

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Steve Busch, District Supervisor
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
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Additional information is enclosed for your information.

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

Additional Information April 2015

The source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron, and requires additional treatment to ensure an acceptable quality drinking water. The MDEQ has been working closely with the Operator-in-Charge at the Flint Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

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

MAY 27 2015

REPLY TO THE ATTENTION OF:
WG-15J

DEQ
RESOURCE MANAGEMENT DIVISION
JUN 01 2015
LANSING DISTRICT

Ms. Eleasha Aubrey
2758 Thomas Street
Flint, Michigan 48504

Dear Ms. Aubrey:

Thank you for your January 27, 2015 email to President Obama concerning the quality of the drinking water in the City of Flint, Michigan (Flint). Your email was forwarded to me for a response, since Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency.

To respond to your email, my staff contacted the Michigan Department of Environmental Quality (MDEQ) District Supervisor for the Lansing District, Steve Busch, to discuss Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens. He and his staff are working closely with Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and effectively. Since April 2014, Flint exceeded the health standards for *E. coli* in August 2014, for total coliform bacteria in September 2014, and total trihalomethanes (TTHM) in the fourth quarter of 2014; all other regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts (SDWA). Flint conducted the proper follow-up to the above violations as required by Federal and State regulations. Flint has returned to compliance the bacteria MCL violations that occurred in August and September 2014.

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Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

Additional Information May 2015

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

REPLY TO THE ATTENTION OF:

WG-15J

MAY 27 2015

DEQ
RESOURCE MANAGEMENT DIVISION

JUN 01 2015

LANSING DISTRICT

Ms. Eleasha Aubrey
2758 Thomas Street
Flint, Michigan 48504

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Richard Benzie, MDEQ

Additional Information May 2015

The source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron, and requires additional treatment to ensure an acceptable quality drinking water. The MDEQ has been working closely with the Operator-in-Charge at the Flint Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. The use of Flint River water as a source for your drinking water is an interim source. Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

Some citizens have suggested that the source of drinking water should be switched back to Detroit drinking water which comes from Lake Huron. EPA does not have the authority to require Flint to change its source of drinking water back to Detroit drinking water. The decision to change the source of Flint's drinking water was a local decision, and continues to be a local decision only. However, Flint is obligated to take actions necessary to meet drinking water standards.

Also, some citizens have noted concerns regarding the health effects of TTHMs. By law, Flint must inform consumers of health standard exceedances. The risk of developing long-term health problems from TTHM exposure is low for those in general good health and can be a concern after years of ingestion. The risk of developing health problems is higher for some sub-populations, such as the immune-compromised and pregnant women; therefore, this group may want to seek alternative sources of water, such as bottled water, or purchase a home water treatment device. Consumers may want to talk with their doctors to help them make individual health decisions.

Telephone numbers for citizens to call if they have further concerns about their drinking water quality or if citizens would like their drinking water tested by Flint:

Flint Water Service Center deals with problems in the distribution system: (810) 766-7202

Flint Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: (810) 787-6537

Prysby, Mike (DEQ)

From: Ostlund, Peter (DEQ)
Sent: Friday, February 06, 2015 11:52 AM
To: Dee, Rhiannon; Benzie, Richard (DEQ)
Cc: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Crooks, Jennifer; Poy, Thomas; Vantil, Barbara
Subject: RE: (CWA - FY15-124819-3709-CV) Referred to Region - Michigan

I think we're done with this. We just usually follow up with what we've found or know about the complaint. I think Richard summarized the issues with the Flint Water system, which has received a lot of press lately.

-Pete

Peter Ostlund
Field Operations Section Chief
Water Resources Division
Michigan Dept. of Environmental Quality
P.O. Box 30458
Lansing, Michigan 48909-7958
517-898-5128 (iPhone)
ostlundp@michigan.gov

From: Dee, Rhiannon [mailto:dee.Rhiannon@epa.gov]
Sent: Friday, February 06, 2015 11:50 AM
To: Benzie, Richard (DEQ)
Cc: Ostlund, Peter (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ); Crooks, Jennifer; Poy, Thomas; Vantil, Barbara
Subject: RE: (CWA - FY15-124819-3709-CV) Referred to Region - Michigan

Richard,

While I understand this complaint conflates various issues, my intention of forwarding it on to Pete and Barry was to relay the potential NPDES impacts of the complainants allegations.

Best,

Rhiannon Dee
Program Analyst
U.S. Environmental Protection Agency
Water Division, WC-15J
(312) 886-4882
dee.rhiannon@epa.gov

From: Benzie, Richard (DEQ) [mailto:BENZIER@michigan.gov]
Sent: Friday, February 06, 2015 9:38 AM
To: Dee, Rhiannon
Cc: ostlundp@michigan.gov; Busch, Stephen (DEQ); Prysby, Mike (DEQ); Crooks, Jennifer; Poy, Thomas
Subject: RE: (CWA - FY15-124819-3709-CV) Referred to Region - Michigan

I'm not sure what this complainant is alleging. Do you want Michigan to respond to the allegation that a "company or individual dumped millions of gallons of raw sewage into the city of Flint drinking water" or the

allegation that "they(?) have dumped a potential cancer causing chemical into the city's drinking water" or the allegation that the city of Flint is flushing hydrants and charging customers double? The Office of Drinking Water and Municipal Assistance cannot address the issue surrounding the dumping of raw sewage and we don't interfere with water rates, but maybe an explanation of the issues that have confronted the city of Flint and their public water supply will help you understand the overall problem.

Last spring, the city of Flint decided to begin relying upon the Flint River as their source of drinking water using a treatment plant that was designed to do so. Last summer, they experienced difficulties with stagnation in some areas of the distribution system due to significantly reduced demands as a result of the loss of a significant percentage of their residential and industrial demands that accelerated over the last decade. During the summer of 2014, they also had a couple of monitoring periods where they detected total coliform at monitoring sites in these stagnant areas, and one time they detected E.coli present. The ensuing boil water advisories and public notification heightened customer concern about the quality of drinking water as a result of the switch from Detroit to the Flint River. Detroit supplied Flint with drinking water from Lake Huron, a much higher quality source than the Flint River. However, monitoring of the Flint water treatment plant tap has never indicated unacceptable water entering the distribution system. In response to these coliform detections and in an effort to prevent a recurrence, the city also increased flushing water mains in low flow areas and they have attempted to ensure the presence of a chlorine residual throughout the distribution system (is this the "potential cancer causing chemical" the complainant mentions?).

Compounding the problem of customer confidence was the initial monitoring for disinfection byproducts conducted by Flint under the Stage 2 DBR after their switch to the Flint River. The initial monitoring reported significantly elevated levels of total trihalomethane (TTHM) compounds throughout the city's distribution system. Our district office advised the city that they needed to immediately implement operational techniques at the treatment plant and in the distribution system to reduce the formation of these compounds. The steps the city of Flint has taken have been successful and have reduced TTHM concentrations to the point where the latest results are below the drinking water standard. However, the standard is calculated on a running annual average and it is likely to be another 3 to 6 months before the annual average at each monitoring station will (hopefully) meet the standard. Until then, the city has to continue to provide quarterly public notification, which will continue to concern residents despite the latest TTHM results.

The switch to the Flint River, the microbiological problems and the elevated TTHM concentrations experienced last year in Flint have caused a high level of customer dissatisfaction and distrust. The city is working diligently to restore that confidence, but it will not be accomplished easily or overnight. You should also know that the switch to the Flint River is an interim measure intended to last only until a 72-inch pipeline from Lake Huron to the Flint water treatment plant is completed. It is currently under construction and expected to be in operation in mid-2016. At that point, the city's drinking water should again be very similar in quality to what they were receiving from Detroit.

Although the subject(s) of this complaint are not clear to me, I suspect it is a result of the media coverage of the recent problems with the city's water supply. However, the information from your initial contact indicates a Grand Blanc, Michigan address, which is not in the city of Flint service area. As I mentioned, our Lansing district office has been dealing with city representatives on this issue. If you have further questions, feel free to contact either Michael Prysby or Steve Busch. They are receiving this message so you have their contact information. You may also wish to communicate with your Region 5 counterparts in the Office of Drinking Water & Ground Water, Jennifer Crooks or Tom Poy, who have received similar complaints and with whom we have communicated regularly on these issues.

Please let us know if someone from EPA will respond to the complainant, or if you expect Michigan DEQ to do so.

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

From: Ostlund, Peter (DEQ)
Sent: Friday, February 06, 2015 6:55 AM
To: Dee, Rhiannon
Cc: Selden, Barry (DEQ); Benzie, Richard (DEQ); Bartley, Cheryl (DEQ)
Subject: RE: (CWA - FY15-124819-3709-CV) Referred to Region - Michigan

Rhiannon, this is a drinking water complaint, not an NPDES compliant. Flint does have SSOs, and reports those. That's not the cause of this complaint.

There are public concerns with Flint's drinking water system, which switch from the city of Detroit supply to their own supply. Detroit's source water is much better, so the public may be noticing some changes.

I've copied Richard Benzie, how is the Field Operations Chief in our division that handles drinking water. If you need more follow up, he can provide it.

Thanks, Pete

Peter Ostlund
Field Operations Section Chief
Water Resources Division
Michigan Dept. of Environmental Quality
P.O. Box 30458
Lansing, Michigan 48909-7958
517-898-5128 (iPhone)
ostlundp@michigan.gov

From: Dee, Rhiannon [mailto:dee.Rhiannon@epa.gov]
Sent: Thursday, February 05, 2015 5:11 PM
To: Ostlund, Peter (DEQ); Selden, Barry (DEQ)
Subject: FW: (CWA - FY15-124819-3709-CV) Referred to Region - Michigan

Hi there,

Hope all is well. We received this complaint a while back. Complainant is alleging discharges into Flint River.

Let me know if you have any questions or if I should forward this on to someone else.

Best,

Rhiannon Dee
Program Analyst
U.S. Environmental Protection Agency
Water Division, WC-15J
(312) 886-4882
dee.rhiannon@epa.gov

From: howard.donna@epa.gov [mailto:howard.donna@epa.gov]
Sent: Monday, January 12, 2015 11:21 AM
To: Dee, Rhiannon

Cc: Beese, Jennifer
Subject: FWD: (CWA - FY15-124819-3709-CV) Referred to Region - Michigan

01/12/2015

SUBJECT: FWD: (CWA - FY15-124819-3709-CV) Referred to Region - Michigan
FROM: howard.donna@epa.gov
TO: Dee.Rhiannon@epa.gov
CC: Beese.Jennifer@epa.gov

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

1/11/2015 10:55 AM

HQ LEAD NUMBER: FY15-124819-3709-CV

SUBJECT: Referred to Region - Michigan

FROM: sargent

TO:

Name: marcia

Address: po box 277

City: grand blanc

State: Michigan

Zip: 48480

Phone: 8103368486

Alleged Violator's Name: city of flint michigan

Alleged Violator's Address: water department

Alleged Violator's City: flint

Alleged Violator's State: Michigan

Alleged Violator's Zip: 48503

Tip or Complaint: an individual or company dumped several million gallons of raw sewage into the city of flint Michigan drinking water and now they have dumped a potential cancer causing chemical into the water to cover up their negligent act. people are getting sick and skin rashes are becoming apparent, especially in the young and elderly. we will keep going until something is done to correct this "mistake"

Specific Directions: Flint river. runs right through the city of flint. they have been opening the hydrants and letting water

pour out of them to "purge" the system, then charging consumers double for their mistake.

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? Yes

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, February 05, 2015 8:36 AM
To: sheila.bw@hotmail.com
Subject: RE: Email Inquiry

Sheila,

The water supplied to residents in Genesee County (outside the city of Flint) is supplied to Genesee County from Detroit. Genesee County purchases drinking water from Detroit and this water is treated at the Detroit-Lake Huron Water Treatment Plant (WTP) and is conveyed to Genesee County through approximately 60 miles of 72-inch transmission main. The drinking water supplied to Genesee County from Detroit via the Detroit Lake Huron WTP and the transmission main meets all applicable state and federal drinking water standards. If you have any additional questions concerning water quality in Genesee County and/or the city of Flint, please don't hesitate to call me at the number provided below.

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

From: BadAddress
Sent: Saturday, January 31, 2015 2:30 PM
To: deq-assist
Subject: Email Inquiry

CompanyName:
FirstName: Sheila
LastName: Bailey-Waddell
Email: sheila.bw@hotmail.com
DayPhone: 810-259-3056
AltPhone:
Address:
City:
State:
ZipCode:
County: Genesee
YourMessage: Why are there continuous misconceptions that the quality of water in Genesee County are safe? This is misinformation and false. http://www.minbcnews.com/news/story.aspx?id=1157184#.VM0sXvmzGSo

Prysby, Mike (DEQ)

From:	Prysby, Mike (DEQ)
Sent:	Tuesday, January 20, 2015 1:15 PM
To:	Busch, Stephen (DEQ); Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ); Rosenthal, Adam (DEQ); Rennaker, Joanne (DEQ)
Subject:	tally of Flint calls
Attachments:	Calls from Public list.doc

See revised list....

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

Flint TTHM Violation
Completed Calls from the Public
MFP

1/5: Mike P.-Ron Fonger – Flint Journal – Media inquiry
1/5: Mike P. - Lawrence Reynolds – Mott Children's Health
1/5: Mike P. - Walter Smith-Randolth – NBC 25 Flint News – Recorded interview
1/5: Adam R. – Denise – Flint Resident

1/6: Mike P. - Arthur Woodston – resident – general questions, invite to res. Mtg
1/6: Mike P. - Bradley - resident – ok to boil water for baby formula bottle?
1/6: Mike P. - Raimy Elley – resident – gen info., most upset on city's delay to notify
1/6: Mike P. - Reps. Sheldon Neeley and Phil Phelps – update State Reps for Flint Districts on TTHM issue. Richard Benzie and Sarah Howes participated.
1/6: Steve B. – Cheryl Wormsman – friend of Flint resident- general questions/concerns

1/8: Mike P. – Sandra Wilkes – resident – excessive cost for poor quality, who can force Flint to re-connect to Detroit…
1/8: Mike P – Arthur Woodston (2nd call). Recc. Not to drink water from doc…where do I go?

1/9: Mike P – Patricia Warner – Gen. info…excessive cost/poor WQ, better comm. from city needed
1/9: Mike P – Jeanette Doll (DTMB) – left message to call me back concerning alt. water for state Bldg.. in Flint. Answer ? pertaining to future TTHM results and PN. Call most likely to ensue on Monday 1/12. **** Completed call w. Jeanette on 1/12 and answered her question pertaining to future TTHM monitoring and how it will pertain to compliance.**
1/14: Mike P – Mindy Blasdeel – resident – daughter with skin rash since being on DWSD water, On-going bladder infection – Mindy was at physician office and call was cut short. I will contact Mindy tomorrow to finish our call.
1/20: Mike P- Paris Glazer (Assoc. Attorney – LaRose Bosco law firm) – determining validity for Case claim (Fed. Statute claim) for Flint residents. Are there any way(s) to remediate high TTHM levels before KWA? Possible FOIA…..

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, January 14, 2015 4:05 PM
To: Rennaker, Joanne (DEQ)
Subject: letter for final
Attachments: Resp Ltr to resident-Busch.doc

Joanne,

Attached is a letter for final to a concerned resident from the city of Flint for Steve's signature. Thanks!

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

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

January 15, 2015

Ms. Patty Warner
2721 Coventry Court
Flint, Michigan 48503

Dear Ms. Warner:

SUBJECT: City of Flint – Water System, Total Trihalomethane (TTHM) Maximum Contaminant Level (MCL) Violation

Thank you for your e-mail of January 6, 2015, to Ms. Nancy Grijaiva in the Director's Office of the Department of Community Health (DCH). Your e-mail was referred from DCH to the Department of Environmental Quality (DEQ), Office of Drinking Water and Municipal Assistance (ODWMA) for response.

The City of Flint's community water supply (CWS) is regulated under the *Michigan Safe Drinking Water Act, 1976 PA 399, as Amended, and the Administrative Rules, Supplying Water to the Public R325.10101 to R325.12820*, (Act 399) authority for which has been conferred to the DEQ, ODWMA.

District staff from the ODWMA contacted you on January 9, 2015, to address your concerns regarding the City of Flint's CWS system and specifically a violation of the drinking water standard MCL for TTHM following the quarterly monitoring period which ended in December 2014. Concerns discussed included the quality of the City's drinking water in relation to rates being charged to Flint residents, and the requirements regarding public notification of the TTHM MCL violation to customers of the water system. Factors that contribute to TTHM formation were also discussed.

Development of the TTHM standard is designed to limit exposure to TTHM's based on concerns that TTHM, if consumed in excess of the standard over many years, may lead to increased health risks. Therefore, the TTHM MCL standard is based on a Locational Running Annual Average (LRAA). The LRAA is a separate average of the samples for each required location, based on sample results from the previous four quarters, and evaluates long term exposure under worst case conditions rather than single sample results. While TTHM monitoring results from earlier quarters were elevated, the LRAA for the City's eight required sample locations did not exceed the standard until the quarterly monitoring period which ended in December 2014.

District staff confirmed that the City has met the Tier 2 public notification requirements under Act 399 regarding the TTHM MCL violation by directly mailing the public notification to all of its customers within 30 days following the violation. While the City

could have provided water customers with additional information regarding TTHM results prior to the MCL standard violation, such action is not required under Act 399 and may have led to further confusion for customers.

District Staff explained that the City began taking steps to address elevated levels of TTHM prior to the violation by undergoing an operational evaluation of the City's water system. The operational evaluation consists of an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in source water quality, and treatment changes or problems that may contribute to TTHM formation and what steps could be considered to minimize future exceedances. The City has already implemented several changes based on the results of this evaluation and continues to implement others.

District staff also explained that the City's long term solution to reduce TTHM levels is connection to the Karegnondi Water Authority to obtain higher quality source water from Lake Huron.

Finally, district staff explained that water rates are neither established nor regulated under Act 399. That the composition of each water system is unique based on aspects such as water source, water quality, treatment, extent of distribution system, and the type and number of customers being served. As such water rates must be established at the local level for each CWS. The DEQ encourages water customers to contact their water supplier and inquire how water rates have been established and what these funds are used to support.

If you need further information or assistance, please contact Mr. Michael Prysby, District Engineer, ODWMA, DEQ at (517) 290-8817,

Sincerely,

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

cc: Mr. Richard Benzie, P.E., DEQ
Ms. Liane Shekter Smith, P.E., DEQ
Ms. Veronica Willard, DEQ
Ms. Nancy Grijalva, DCH

Prysby, Mike (DEQ)

From: Busch, Stephen (DEQ)
Sent: Wednesday, January 14, 2015 3:07 PM
To: Prysby, Mike (DEQ)
Cc: Rennaker, Joanne (DEQ)
Subject: RE: Flint resident letter
Attachments: Resp Ltr to resident-Busch.doc

Mike,

Please review the revised letter (attached). If ok, Jo Anne can final and I will sign it first thing tomorrow morning. Thanks.

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

From: Prysby, Mike (DEQ)
Sent: Wednesday, January 14, 2015 11:36 AM
To: Busch, Stephen (DEQ)
Subject: Flint resident letter

Steve,

Attached is the letter to Ms. Warner that summarizes my call...routed to us from DCH ...since Ms. Warner contacted them first. I tried to attach the boiler plate opening and closing paragraphs that Joanne provided me; however, my link to the scanned documents won't connect. I you need to look at the boiler plate paragraphs, I can have Joanne email it to you. I will also forward you (in a separate e-mail) the original assignment from Veronica that shows the e-mail thread beginning with DHC...to verify that all the appropriate staff are being copied.

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

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, January 14, 2015 11:37 AM
To: Busch, Stephen (DEQ)
Subject: FW: DIR00004 Warner / Water toxins in Flint MI
Attachments: ODWMA 15 DIR00004I Warner.pdf

Steve,

Here is the original assignment fyi...

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

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Friday, January 09, 2015 3:25 PM
To: Seymour, 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

Prysby, Mike (DEQ)

From: Thelen, Mary Beth (DEQ)
Sent: Friday, January 09, 2015 11:13 AM
To: Prysby, Mike (DEQ); Willard, Veronica (DEQ)
Cc: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)
Subject: RE: Constituent Inquiry

Thanks.

Mary Beth

Mary Beth Thelen
Management Assistant to Director Dan Wyant
Department of Environmental Quality
Constitution Hall, 6th Floor South
Phone: 517-284-6712 or 284-6700 (new numbers)
Fax: 517-241-7401
Thelenm2@michigan.gov

From: Prysby, Mike (DEQ)
Sent: Friday, January 09, 2015 11:07 AM
To: Willard, Veronica (DEQ); Thelen, Mary Beth (DEQ)
Cc: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)
Subject: RE: Constituent Inquiry

I will respond to this person. I'm am not aware (officially) of CDC involvement.

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 10:54 AM
To: Thelen, Mary Beth (DEQ)
Cc: Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)
Subject: RE: Constituent Inquiry

Liane is going to be out, but I believe that Mike Prysby has been handling this issue. Mike – can you let me know if you are the one to handle this?

From: Thelen, Mary Beth (DEQ)
Sent: Friday, January 09, 2015 10:46 AM
To: Shekter Smith, Liane (DEQ)
Cc: Willard, Veronica (DEQ); Shaler, Karen (DEQ)
Subject: FW: Constituent Inquiry

Hi Liane, please scroll down to the bottom of this email. Could you please have the appropriate staff respond to this constituent as appropriate?

Please let me know if I need to make the Director aware of this particular note, or Brad.

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

From: Danieli, Sharon (DCH)
Sent: Wednesday, January 07, 2015 9:15 AM
To: Thelen, Mary Beth (DEQ)
Subject: Constituent Inquiry

Hi Mary Beth,

This was forwarded to me by Nancy Grijalva in the DCH Director's Office. In checking with our Public Health Administration, they indicated this should be reviewed/responded to by DEQ. Could you please forward to the appropriate person in your Department?

Thanks for your help. If you have any questions, please let me know.

Sharon K. Danieli
Secretary
Director's Office
Michigan Department of Community Health
Phone: (517) 335-0633
Fax: (517) 373-4288
Email: danielis@michigan.gov

Confidentiality Notice: This message, including any attachments, is intended solely for the use of the named recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, disclosure or distribution of this communication(s) is expressly prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy any and all copies of the original message.

From: stixdesign [mailto:stixdesign@sbcglobal.net]
Sent: Tuesday, January 06, 2015 11:09 AM
To: Grijalva, Nancy (DCH)
Subject: water toxins in Flint, MI

Greetings,
I wrote to the CDC regarding Flint's failure to meet safe quality standards. We were sent a notice on Friday warning of potential health risks. A second notice is forthcoming. Citizens are beyond angry and fearful and it's going viral. Articles can be found on Mlive. The CDC said they could investigate, but the request would have to

come from the state. They urged me to contact you. I look foward to hearing from you. The reporter covering this story is Ron Fonger at rfonger@mlive.com

Thank you,
Patricia L. Warner
810 - 919 - 7487

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, November 25, 2014 9:41 AM
To: Bennett, Charles (DEQ); Bartley, Cheryl (DEQ)
Subject: Fwd: NRC#1101917

PEAS notification late last nite regarding transformer oil release into Thread Creek (tributary to Flint River). You have already received notification. Flint WTP intake ten miles upstream; thus, they are not impacted.

Sent from my iPhone

Begin forwarde message:

> **From:** "Skinker, Bethel (DEQ)" <SKINKERB@michigan.gov>
> **Date:** November 25, 2014, 12:06:01 AM EST
> **To:** "Prysby, Mike (DEQ)" <PRYSBYM@michigan.gov>, "Busch, Stephen (DEQ)" <BUSCHS@michigan.gov>
> **Subject: FW: NRC#1101917**
>
> Got a phone call from PEAS last night and this email. I tried calling the plant and their emergency number but no one answered. I left a message to call me back, but I haven't back. I looked at the map and it looks like the spill is downstream of Flint's WTP.
>
> Bethel

From: DEQ-PEAS
Sent: Monday, November 24, 2014 11:00 PM
To: Skinker, Bethel (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: Fwd: NRC#1101917

Here is the same report as it came in via NRC.

PEAS On Call
PEAS Hotline: 800-292-4706
Website: www.michigan.gov/deqrelease

Begin forwarded message:

> **From:** <HQS-PF-fldr-NRC@uscg.mil>
> **Date:** November 24, 2014 at 22:02:20 EST
> **To:** <deq-peas@michigan.gov>, <vanotterenb@michigan.gov>, <wolfj1@michigan.gov>, <franksr1@michigan.gov>
> **Subject: NRC#1101917**
>
> NATIONAL RESPONSE CENTER 1-800-424-8802
> ***GOVERNMENT USE ONLY***GOVERNMENT USE ONLY***
> Information released to a third party shall comply with any

applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 1101917

INCIDENT DESCRIPTION

*Report taken by: CIV BRENT TALIAFERRO at 21:58 on 24-NOV-14
Incident Type: FIXED
Incident Cause: NATURAL PHENOMENON
Affected Area: THREAD CREEK
Incident was discovered on 24-NOV-14 at 19:01 local incident time.
Affected Medium: WATER

REPORTING PARTY
Name: ANTHONY ARUINO
Organization: CONSUMERS ENERGY
Address: 3201 EAST COURT ST.
FLINT, MI 48506

PRIMARY Phone: (517)3313995 ALTERNATE Phone: (810)7603540
Type of Organization: PRIVATE ENTERPRISE

SUSPECTED RESPONSIBLE PARTY
Name: ANTHONY ARUINO
Organization: CONSUMERS ENERGY
Address: 3201 EAST COURT ST.
FLINT, MI 48506
PRIMARY Phone: (517)3313995 ALTERNATE Phone: (810)7603540

INCIDENT LOCATION
2801 SOUTH DORT HWY County: GENESEE
City: FLINT State: MI

RELEASED MATERIAL(S)
CHRIS Code: OTF Official Material Name: OIL, MISC: TRANSFORMER
Also Known As:
Qty Released: 2 GALLON(S) Qty in Water: 2 GALLON(S)
CHRIS Code: PCB Official Material Name: POLYCHLORINATED BIPHENYLS
Also Known As:
Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

CALLER REPORTED A RELEASE OF MATERIALS DURING WINDY WEATHER. A POLE
MOUNTED TRANSFORMER WAS KNOCKED DOWN.

SENSITIVE INFORMATION

INCIDENT DETAILS

Package: N/A
Building ID:
Type of Fixed Object: TRANSFORMER
Power Generating Facility: UNKNOWN
Generating Capacity:
Type of Fuel:
NPDES:
NPDES Compliance: UNKNOWN
---WATER INFORMATION---
Body of Water: THREAD CREEK
Tributary of:
Nearest River Mile Marker:
Water Supply Contaminated: UNKNOWN

IMPACT

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: NO Hospitalized: Empl/Crew: Passenger:
FATALITIES: NO Empl/Crew: Passenger: Occupant:
EVACUATIONS:NO Who Evacuated: Radius/Area:

Damages: NO

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air: N			
Road: N	Major Artery:N		
Waterway: N			
Track:			

Environmental Impact: UNKNOWN
Media Interest: UNKNOWN Community Impact due to Material:

REMEDIAL ACTIONS

INVESTIGATION UNDERWAY
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: PARTLY CLOUDY, °F

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

CENTERS FOR DISEASE CONTROL (GRASP)
24-NOV-14 22:01 (770)4887100
DHS NOC (NOC)
24-NOV-14 22:01 (202)2828114
DOT CRISIS MANAGEMENT CENTER (MAIN OFFICE)
24-NOV-14 22:01 (202)3661863
U.S. EPA V (MAIN OFFICE)
(312)3532318
FEDERAL EMERGENCY MANAGEMENT AGENCY (MAIN OFFICE)
24-NOV-14 22:01 (800)6347084
INFO ANALYSIS AND INFRA PROTECTION (MAIN OFFICE)
24-NOV-14 22:01
MACKINAC COUNTY EMERGENCY MGMT (COMMAND CENTER)
24-NOV-14 22:01 (906)4301466
MICHIGAN DEPT OF COMMUNITY HEALTH (HSEES)
24-NOV-14 22:01 (517)3358364
MI INTELLIGENCE OPERATIONS CENTER (FUSION CENTER)
24-NOV-14 22:01 (517)2418000
MI INTELLIGENCE OPERATIONS CENTER (CIP DESK)
24-NOV-14 22:01 (517)3350262
NATIONAL INFRASTRUCTURE COORD CTR (MAIN OFFICE)
24-NOV-14 22:01 (202)2829201
NATIONAL INFRASTRUCTURE COORD CTR (INFRASTRUCTURE PROTECTION)
24-NOV-14 22:01 (202)2829201
NOAA RPTS FOR MI (MAIN OFFICE)
24-NOV-14 22:01 (206)5264911
NATIONAL RESPONSE CENTER HQ (AUTOMATIC REPORTS)
24-NOV-14 22:01 (202)2671136
OFFICE OF ENV. POLICY & COMPLIANCE (MAIN OFFICE)
24-NOV-14 22:01 (215)5975012

MICHIGAN DEQ (MAIN OFFICE)
24-NOV-14 22:01 (800)2924706
MICHIGAN DEQ (MAIN OFFICE 2)
24-NOV-14 22:01 (517)9305784

ADDITIONAL INFORMATION

*** END INCIDENT REPORT #1101917 ***
Report any problems by calling 1-800-424-8802
PLEASE VISIT OUR WEB SITE AT http://www.nrc.uscg.mil

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, November 25, 2014 9:36 AM
To: Skinker, Bethel (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: Re: NRC#1101917

Responded to PEAS call this morning...discharge went to Thread Creek and into Flint River about ten miles downstream of Flint WTP intake, thus no impact to the WTP. WRD is to be notified of the release.

Sent from my iPhone

On Nov 25, 2014, at 12:06 AM, "Skinker, Bethel (DEQ)" <SKINKERB@michigan.gov> wrote:

> Got a phone call from PEAS last night and this email. I tried calling the plant and their emergency number but no one answered. I left a message to call me back, but I haven't back. I looked at the map and it looks like the spill is downstream of Flint's WTP.
>
> Bethel

From: DEQ-PEAS
Sent: Monday, November 24, 2014 11:00 PM
To: Skinker, Bethel (DEQ)
Cc: Busch, Stephen (DEQ)
Subject: Fwd: NRC#1101917

Here is the same report as it came in via NRC.

PEAS On Call
PEAS Hotline: 800-292-4706
Website: www.michigan.gov/deqrelease

Begin forwarded message:

> **From:** <HQS-PF-fldr-NRC@uscg.mil>
> **Date:** November 24, 2014 at 22:02:20 EST
> **To:** <deq-peas@michigan.gov>, <vanotterenb@michigan.gov>, <wolfj1@michigan.gov>, <franksr1@michigan.gov>
> **Subject: NRC#1101917**
>
> NATIONAL RESPONSE CENTER 1-800-424-8802
> ***GOVERNMENT USE ONLY***GOVERNMENT USE ONLY***
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>
> INCIDENT DESCRIPTION

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Incident Cause: NATURAL PHENOMENON
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PRIMARY Phone: (517)3313995 ALTERNATE Phone: (810)7603540

INCIDENT LOCATION

2801 SOUTH DORT HWY County: GENESEE
City: FLINT State: MI

RELEASED MATERIAL(S)

CHRIS Code: OTF Official Material Name: OIL, MISC: TRANSFORMER
Also Known As:
Qty Released: 2 GALLON(S) Qty in Water: 2 GALLON(S)
CHRIS Code: PCB Official Material Name: POLYCHLORINATED BIPHENYLS
Also Known As:
Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

CALLER REPORTED A RELEASE OF MATERIALS DURING WINDY WEATHER. A POLE
MOUNTED TRANSFORMER WAS KNOCKED DOWN.

SENSITIVE INFORMATION

INCIDENT DETAILS

Package: N/A
Building ID:
Type of Fixed Object: TRANSFORMER
Power Generating Facility: UNKNOWN
Generating Capacity:
Type of Fuel:
NPDES:
NPDES Compliance: UNKNOWN
---WATER INFORMATION---
Body of Water: THREAD CREEK
Tributary of:
Nearest River Mile Marker:
Water Supply Contaminated: UNKNOWN

IMPACT

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: NO Hospitalized: Empl/Crew: Passenger:
FATALITIES: NO Empl/Crew: Passenger: Occupant:
EVACUATIONS:NO Who Evacuated: Radius/Area:

Damages: NO

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air: N			
Road: N			Major Artery:N
Waterway: N			
Track:			

Environmental Impact: UNKNOWN
Media Interest: UNKNOWN Community Impact due to Material:

REMEDIAL ACTIONS

INVESTIGATION UNDERWAY
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: PARTLY CLOUDY, °F

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

CENTERS FOR DISEASE CONTROL (GRASP)
24-NOV-14 22:01 (770)4887100
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24-NOV-14 22:01 (800)6347084
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24-NOV-14 22:01 (800)2924706
MICHIGAN DEQ (MAIN OFFICE 2)
24-NOV-14 22:01 (517)9305784

ADDITIONAL INFORMATION

*** END INCIDENT REPORT #1101917 ***
Report any problems by calling 1-800-424-8802
PLEASE VISIT OUR WEB SITE AT http://www.nrc.uscg.mil

Prysby, Mike (DEQ)

From:	Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent:	Thursday, October 23, 2014 4:04 PM
To:	janburgess52@comcast.net
Cc:	Poy, Thomas; Howard, Donna; Prysby, Mike (DEQ); Busch, Stephen (DEQ); Porter, Andrea
Subject:	Flint, Michigan Citizen complaint - Drinking water quality and Chloride levels

Dear Ms. Burgess: You stated below that GM is not using the treated Flint water anymore because of higher chloride levels, which is correct. If you read thru the article link that you sent me or the links below, the Michigan Dept of Environmental Quality (MDEQ) clarified that the higher chloride levels are most likely coming from the City's treatment of the Flint River water with Ferric Chloride, which acts as a coagulant to help remove suspended and dissolved solids and contaminants. A chloride is a salt compound resulting from the combination of the gas chlorine and a metal. As EPA explains (see: http://water.epa.gov/drink/contaminants/secondarystandards.cfm), chlorides cause corrosion.

The Secondary Maximum Contaminant Levels (SMCL) listed in the Federal regulations at 40 CFR 143.3, are levels of contaminants that represent reasonable goals for drinking water quality, and are not enforceable by the State or the Federal governments. The SMCL for chloride is 250 milligrams per liter (mg/L). The MDEQ reports that the chloride levels in the Flint drinking water are approx. 50-60 mg/L which are acceptable levels, based on the SMCL of 250 mg/L. However, it appears General Motors requires a source of water with chloride levels below 20 mg/L.

Chlorine reacts with water to create different species of compounds that serve as disinfectants and acts to oxidize viruses/bacteria, so chlorine is not the same as chloride.

http://www.mlive.com/news/flint/index.ssf/2014/10/gms_decision_to_stop_using_fli.html

http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html

Secondly, your email refers to the poor quality of the Flint drinking water. The source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April this year. The Flint River raw water is a different quality than the Lake Huron raw water; and requires additional treatment to ensure an acceptable quality drinking water. The MDEQ has been working closely with the Operator-in-Charge at the Flint Water Treatment plant to ensure a palatable drinking water is provided to the citizens of Flint. Please note that the use of Flint River water as a source for your drinking water is an interim source; the City of Flint plans to connect to the Karegnondi Water Authority pipeline which will draw water from Lake Huron, in 2016.

The MDEQ is aware of the multiple complaints from citizens and is working closely with the Flint Water Department to ensure the distribution system and the water treatment processes work more efficiently and more effectively. For further information, you can contact Mike Prysby at:

Mike Prysby, District Engineer
Michigan Department of Environmental Quality
Office of Drinking Water and Municipal Assistance, Lansing District Office
P.O. Box 30242
Lansing, Michigan 48909-7742

(517) 290-8817
prysbym@michigan.gov

The most likely cause of the brown water (iron deposits and sediments from the very old cast iron pipes that make up the distribution system in Flint), is incorrect use of fire hydrants by demolition contractors in the area during this time. The fire hydrants are turned on for the contractors to use, and since the water is under pressure, the fast flow of the water scours the insides of the pipes, causing sediment and rust to become free floating. The City conducts this type of cleaning of the pipes in a regulated/controlled process, and requires at least ten minutes for all the sediment to be flushed out of the water main. However, the contractors do not always let the water flush for ten minutes, thus sediment remains in the water main. The City's flushing of the water mains should alleviate the sediment and brown water issues. You can contact the Flint Water Service Center to request that your lines be fully flushed.

Telephone numbers for you to call if you have further concerns:
Flint Water Service Center deals with problems in the distribution system: 810-766-7202
Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: 810-787-6537

If you have additional questions, please contact me at (312) 886-0244 or crooks.jennifer@epa.gov.

Jennifer Kurtz Crooks
Michigan Program Manager
Ground Water and Drinking Water Branch
United States Environmental Protection Agency, Region 5
77 West Jackson Blvd, WG-15J
Chicago, Illinois 60604
312.886.0244
crooks.jennifer@epa.gov

From: howard.donna@epa.gov [mailto:howard.donna@epa.gov]
Sent: Wednesday, October 15, 2014 11:46 AM
To: Poy, Thomas
Subject: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan

10/15/2014

SUBJECT: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan
FROM: howard.donna@epa.gov
TO: poy.thomas@epa.gov
CC:

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

10/14/2014 9:07 AM

HQ LEAD NUMBER: FY15-122649-3715-CV

SUBJECT: Referred to Region - Michigan

FROM: janburgess52@comcast.net

TO:

Name: Jan Burgess

Address: 720 Commonwealth Ave

City: Flint

State: Michigan

Zip: 48503

Phone: 810-235-6530

Alleged Violator's Name: City of Flint

Alleged Violator's Address: 1101 S. Saginaw St.

Alleged Violator's City: Flint

Alleged Violator's State: Michigan

Alleged Violator's Zip: 48502

Tip or Complaint: Earlier this year, the City of Flint, MI changed its water supply from the City of Detroit [Lake Huron] to the Flint River. This river has a very long history of pollution. Since this change, our drinking water has tripled in cost and the quality varies daily. Some days it smells like an over-chlorinated swimming pool; other days, like pond scum. It often is brown in color and frequently has visible particles floating in it. We've been under several boil water advisories due to e-coli contamination. Just this morning our local paper reports that General Motors Engine plant has shut off Flint River water to the plant due to the over-chlorination and the fears that the water will cause corrosion. http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html#cmpid=nsltr_stryheadline. People in Flint have had to resort to buying bottled water or having purification systems installed in their homes. Some residents have even had private wells dug. The water is not safe to drink, cook or wash dishes with, or even give to pets. We worry every time we shower. The City of Flint is still very economically depressed and most citizens cannot afford to do anything other than use the river water. Many of them have NO water at all due to the extremely high water bills. There is reasonable suspicion that reports have been falsified. Some residents have had water tested privately and the results are not even close to those reported by the City. Calls to the City and State have resulted in no action whatsoever.

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? No

Prysby, Mike (DEQ)

From: Busch, Stephen (DEQ)
Sent: Thursday, October 16, 2014 9:18 AM
To: Crooks, Jennifer; Prysby, Mike (DEQ)
Subject: RE: Another Flint complaint

Jennifer,

Here is some info on the chloride issue GM has indicated regarding water in Flint and Mike's discussion with the reporter below. As we discussed we do not follow the secondary MCL's in Michigan, but even if we did these levels are well below the secondary level for chloride.

http://www.mlive.com/news/flint/index.ssf/2014/10/gms_decision_to_stop_using_fli.html

http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html

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

From: Prysby, Mike (DEQ)
Sent: Monday, October 13, 2014 3:48 PM
To: Busch, Stephen (DEQ); Shekter Smith, Liane (DEQ); Wurfel, Brad (DEQ); Feuerstein, Heather (DEQ); Willard, Veronica (DEQ); Benzie, Richard (DEQ)
Subject: Media Inquiry

Ron Fonger from the Flint Journal called me today concerning the GM Engine manufacturing plant in Flint and their intent to temporarily terminate water service from Flint and purchase water from Genesee County (via Flint Twp) until Flint is either treating water from KWA or reducing their chloride concentration from their treated water that meets GM's limit for manufacturing. Ron asked if elevated chlorides are a health concern in Flint. I looked up Flint's MOR and noted that the treated water chloride concentration leaving the WTP ranges between 55 and 65 mg/l which, although not optimal (optimal being <20 mg/l), is satisfactory. Concentrations > 250 mg/l become objectionable due to taste & corrosion issues; however, based on the concentration leaving the WTP, we did not have any health-effect concerns. Ron was not able to recall the maximum chloride level acceptable to GM; however, I stressed the importance of not branding Flint's water as "corrosive" from a public health standpoint simply because it does not meet a manufacturing facility's limit for production. Ron also asked if the treatment process adds chloride. I explained that their primary coagulant is ferric chloride and this does add some chloride to the finished water; however, raw water chloride concentration is generally in the mid 40s mg/l; thus, the contribution from ferric chloride is not significant.

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

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Thursday, October 16, 2014 8:45 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject: Another Flint complaint

This complaint came thru the SDWA Hotline. Interesting—this citizen reported that General Motors shut off their line to Flint water due to over-chlorination. See the link below.
Jennifer

From: Poy, Thomas
Sent: Wednesday, October 15, 2014 12:07 PM
To: Crooks, Jennifer
Subject: FW: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan

Jen: Can you use the same reply for the control to reply to this similar complaint about Flint water?

Thanks.

Tom

Tom Poy
Chief, Ground Water and Drinking Water Branch
USEPA - Region 5
(312) 886-5991

From: howard.donna@epa.gov [mailto:howard.donna@epa.gov]
Sent: Wednesday, October 15, 2014 11:46 AM
To: Poy, Thomas
Subject: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan

10/15/2014

SUBJECT: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan
FROM: howard.donna@epa.gov
TO: poy.thomas@epa.gov
CC:

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

10/14/2014 9:07 AM

HQ LEAD NUMBER: FY15-122649-3715-CV

SUBJECT: Referred to Region - Michigan

FROM: janburgess52@comcast.net

TO:

Name: Jan Burgess

Address: 720 Commonwealth Ave

City: Flint

State: Michigan

Zip: 48503

Phone: 810-235-6530

Alleged Violator's Name: City of Flint

Alleged Violator's Address: 1101 S. Saginaw St.

Alleged Violator's City: Flint

Alleged Violator's State: Michigan

Alleged Violator's Zip: 48502

Tip or Complaint: Earlier this year, the City of Flint, MI changed its water supply from the City of Detroit [Lake Huron] to the Flint River. This river has a very long history of pollution. Since this change, our drinking water has tripled in cost and the quality varies daily. Some days it smells like an over-chlorinated swimming pool; other days, like pond scum. It often is brown in color and frequently has visible particles floating in it. We've been under several boil water advisories due to e-coli contamination. Just this morning our local paper reports that General Motors Engine plant has shut off Flint River water to the plant due to the over-chlorination and the fears that the water will cause corrosion. http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html#cmpid=nsltr_stryheadline. People in Flint have had to resort to buying bottled water or having purification systems installed in their homes. Some residents have even had private wells dug. The water is not safe to drink, cook or wash dishes with, or even give to pets. We worry every time we shower. The City of Flint is still very economically depressed and most citizens cannot afford to do anything other than use the river water. Many of them have NO water at all due to the extremely high water bills. There is reasonable suspicion that reports have been falsified. Some residents have had water tested privately and the results are not even close to those reported by the City. Calls to the City and State have resulted in no action whatsoever.

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? No

Prysby, Mike (DEQ)

From: Brent Wright <bwright@cityofflint.com>
Sent: Wednesday, October 15, 2014 3:01 PM
To: Busch, Stephen (DEQ)
Cc: rbincsik@cityofflint.com; Prysby, Mike (DEQ)
Subject: Re: Flint Water Complaint

Steve,

I had Mike Glasgow check on this and we have no record of any complaints at this address. We are going to make an attempt to visit this citizen, but with no phone number and name it makes it difficult to schedule a visit. At least we will flush and test hydrants in the area.

Thank you

On Tue, Oct 14, 2014 at 1:54 PM, Busch, Stephen (DEQ) <BUSCHS@michigan.gov> wrote:

Rob,

We have been forwarded the following complaint information from EPA. Could you please let us know whether you have received their complaint and provide a summary of any action or communication with the complaintant? Thanks.

Citizen lives at 324 West Jackson Avenue, Flint, 48505

She states, "Water quality is bad since switching to Flint River. My water stinks like sewage at times. I have developed a cough and rash, brown sediment in sink basins and kitchen sink stays backed up. I have written City Hall Water Dept and Council President for help, but no response. "

Stephen Busch, P.E.

Lansing and Jackson District Supervisor

Office of Drinking Water and Municipal Assistance

MDEQ

517-643-2314

--
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

Prysby, Mike (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Tuesday, October 14, 2014 3:16 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject: RE: Controlled Correspondence RE: Flint drinking water

Question—I was just talking with Tom Poy about this woman's complaint. He was wondering—has Flint changed their flushing routine? If the illegal use of the hydrants by contractors is what is stirring up the debris in the pipes/iron, how come this is now being complained about? Was this a problem when Flint was using Detroit water?
Jennifer

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Tuesday, October 14, 2014 1:00 PM
To: Crooks, Jennifer; Prysby, Mike (DEQ)
Subject: RE: Controlled Correspondence RE: Flint drinking water

Jennifer,

I have forwarded the address and complaint information to the City to confirm if they received any complaint and what follow up may have occurred.

I am not aware of any additional TC positive samples since the BWA at the beginning of September. In addition this address does not appear to be included in the BWA area from August or September.

I await any info from the City on flushing. You may want to ask whether there has been any building work (blight removal) in the area, as contractors have been problematic with hydrant use.

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

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Tuesday, October 14, 2014 1:38 PM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Controlled Correspondence RE: Flint drinking water
Importance: High

Hi, Mike. Yep, another complaint about our favorite water supply ☺

Citizen lives at 324 West Jackson Avenue, Flint, 48505

She states, "Water quality is bad since switching to Flint River. My water stinks like sewage at times. I have developed a cough and rash, brown sediment in sink basins and kitchen sink stays backed up. I have written City Hall Water Dept and Council President for help, but no response."

I think the pos bacti/boil water advisory was in Sept, so can I say that bactis in the past few weeks have met State/Fed'l health standards? How's the TTHMs right now? Any other health standards close to being exceeded?

What do you attribute the sewer smell, and the brown sediment to? Has her area been flushed recently?

I will include the phone numbers of the Water Service Center and the Water Treatment plant that you gave me last time we spoke about Flint.

Can I include your phone number as a contact as well?

Thank you!

Jennifer

Prysby, Mike (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Tuesday, October 14, 2014 2:05 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject: RE: Controlled Correspondence RE: Flint drinking water

Hey, thank you, Steve. Yes, I did include some wording about the improper use of hydrants by local contractors, and the possible need to flush her lines. Let me know if the City will be flushing her lines, so I can include in this letter.
I will forward my draft response/letter to both of you on Thursday, to make sure it is acceptable to you both.
Thanks!
Jennifer

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Tuesday, October 14, 2014 1:00 PM
To: Crooks, Jennifer; Prysby, Mike (DEQ)
Subject: RE: Controlled Correspondence RE: Flint drinking water

Jennifer,

I have forwarded the address and complaint information to the City to confirm if they received any complaint and what follow up may have occurred.

I am not aware of any additional TC positive samples since the BWA at the beginning of September. In addition this address does not appear to be included in the BWA area from August or September.

I await any info from the City on flushing. You may want to ask whether there has been any building work (blight removal) in the area, as contractors have been problematic with hydrant use.

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

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Tuesday, October 14, 2014 1:38 PM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Controlled Correspondence RE: Flint drinking water
Importance: High

Hi, Mike. Yep, another complaint about our favorite water supply ☺

Citizen lives at 324 West Jackson Avenue, Flint, 48505

She states, "Water quality is bad since switching to Flint River. My water stinks like sewage at times. I have developed a cough and rash, brown sediment in sink basins and kitchen sink stays backed up. I have written City Hall Water Dept and Council President for help, but no response."

I think the pos bacti/boil water advisory was in Sept, so can I say that bactis in the past few weeks have met State/Fed'l health standards? How's the TTHMs right now? Any other health standards close to being exceeded?

What do you attribute the sewer smell, and the brown sediment to? Has her area been flushed recently?

I will include the phone numbers of the Water Service Center and the Water Treatment plant that you gave me last time we spoke about Flint.

Can I include your phone number as a contact as well?

Thank you!

Jennifer

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Wednesday, September 17, 2014 1:50 PM
To: HelpDesk, Wellogic (DEQ)
Subject: RE: phone call regarding Flint's water

Call returned

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

From: HelpDesk, Wellogic (DEQ)
Sent: Wednesday, September 17, 2014 12:12 PM
To: Prysby, Mike (DEQ)
Subject: phone call regarding Flint's water

Hi Mike:

This person left a message on my phone regarding the City of Flint's water. He would like a call back.

A.C. Dumas
810-275-5339

Anita

Prysby, Mike (DEQ)

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

Jennifer,

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

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

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

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

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

Jennifer,

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

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

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

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

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

Brent, Robert,

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

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

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

--

Thank you,

Robert Bincsik

Water Distribution and

Sewer Maintenance Supervisor

City of Flint

3310 E. Court Street

Flint, MI 48506

Ph: 810.766.7202 ext. 3413

Fx: 810.743.5758

--

Brent Wright
Water Plant Supervisor
City of Flint
4500 N. Dort Hwy.

Flint, MI. 48505
Ph: 810.787.6537 ext. 3510
Fx: 810.787.3710

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Tuesday, August 19, 2014 10:36 AM
To: Busch, Stephen (DEQ)
Subject: RE: Email Inquiry - Community Drinking Water Contamination Complaint

Steve,

I attempted to contact Mr. Russell this morning to discuss his concerns regarding the BWA in Flint. I left him a message to return my call.

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

From: Busch, Stephen (DEQ)
Sent: Monday, August 18, 2014 1:05 PM
To: Prysby, Mike (DEQ)
Subject: FW: Email Inquiry - Community Drinking Water Contamination Complaint
Importance: High

Mike could you please respond to the attached complaint. I would suggest via the phone number provided.

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

From: deq-assist
Sent: Monday, August 18, 2014 12:52 PM
To: Busch, Stephen (DEQ)
Subject: FW: Email Inquiry - Community Drinking Water Contamination Complaint
Importance: High

Good Afternoon Stephen,
Please review and respond to the customer email attached, or if you determined it appropriate please forward to other staff for response.

Thank you for you assistance.

Tonya

Tonya Schelter, Department Analyst
Michigan Department of Environmental Quality
Office of Environmental Assistance
Environmental Assistance Center 1-800-662-9278

517-284-6873
Deq-assist@michigan.gov
scheltert@michigan.gov
517-284-7272 **SARA Title III Program Phone**
Deq-sara@michigan.gov

Thanks for contacting our Department of Environmental Quality, Office of Environmental Assistance. To help us improve our services, we encourage you to complete our short customer service survey https://www.surveymonkey.com/s/oeacs

Prysby, Mike (DEQ)

From: Prysby, Mike (DEQ)
Sent: Monday, August 18, 2014 3:45 PM
To: BadAddress
Cc: Busch, Stephen (DEQ)
Subject: Re: Email Inquiry

Raney,

I will contact you tomorrow morning concerning Flint's water quality issue.

Sent from my iPhone

On Aug 18, 2014, at 10:58 AM, BadAddress <BadAddress@michigan.gov> wrote:

CompanyName:
FirstName: Raney
LastName: Russell
Email: raneyrussell@gmail.com
DayPhone: 810-407-0513
AltPhone:
Address: 2405 E. Court Street
City: Flint
State: MI
ZipCode: 48503
County: Genesee
YourMessage: I have it on good authority that the Flint City Council members are trying to cover-up a larger drinking water contamination, than that which was originally reported. On August 12, 2014 the new Flint Wate Treatment Plant discharged a large amount of sewage into the Flint River (the same river where it ge its water). On August 16, 2014 the Flint Journal reported that a small area of the city's water was contaminated and that there is a boil advisory until further notice. The water in that area was found to have E. Coli. However, several people from areas in Flint, which are not under the boil water advisory are getting sick. Three neighbors in the College/Cultural area in Flint, MI, 48503 are violently ill, reporting flu like symptoms. A dog has died and 2 dogs are ill in the area of Simcoe Ave, Flint, MI 48507, from cons uming tap water. This issue is wider than the city is reporting and it needs to be investigated immediately.

Rennaker, Joanne (DEQ)

From: Busch, Stephen (DEQ)
Sent: Tuesday, October 20, 2015 5:35 PM
To: Rennaker, Joanne (DEQ)
Subject: FOIA 6797-15 busch - email records
Attachments: FW: FW: FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan; RE: Controlled Correspondence RE: Flint drinking water; RE: Flint Water Complaint; DRAFT Flint Controlled Correspondence; RE: Another Flint complaint; Flint, Michigan Citizen complaint - Drinking water quality and Chloride levels; RE: Flint; Controlled Correspondence from citizen in Flint; FW: Flint Water Question from a Pregnant Flint Resident; FW: Email Inquiry - Community Drinking Water Contamination Complaint

Jo Anne,

Attached are my email records related to Flint drinking water complaints made by citizens and business owners in Flint, MI.
I am reviewing other materials.
Note that these records contain personal info and some draft deliberative material that will need to be redacted or withheld.
I spent 1 hour to locate these emails.

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

Rennaker, Joanne (DEQ)

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

Jennifer,

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

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

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

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

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District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

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To: Prysby, Mike (DEQ)
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Subject: Re: FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

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Brent, Robert,

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

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
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 discus 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 bee addressed or even acknowledged by the city. My neighbor has been having the same issue, and she has also not received any answers, acknowledgement, or regard for her lack of safe drinking water. I have bottled some of the tap

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

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

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? Yes

--

Thank you,

Robert Bincsik

Water Distribution and

Sewer Maintenance Supervisor

City of Flint

3310 E. Court Street

Flint, MI 48506

Ph: 810.766.7202 ext. 3413

Fx: 810.743.5758

--

Brent Wright
Water Plant Supervisor
City of Flint

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

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Tuesday, October 14, 2014 2:05 PM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject: RE: Controlled Correspondence RE: Flint drinking water

Hey, thank you, Steve. Yes, I did include some wording about the improper use of hydrants by local contractors, and the possible need to flush her lines. Let me know if the City will be flushing her lines, so I can include in this letter.
I will forward my draft response/letter to both of you on Thursday, to make sure it is acceptable to you both.
Thanks!
Jennifer

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Tuesday, October 14, 2014 1:00 PM
To: Crooks, Jennifer; Prysby, Mike (DEQ)
Subject: RE: Controlled Correspondence RE: Flint drinking water

Jennifer,

I have forwarded the address and complaint information to the City to confirm if they received any complaint and what follow up may have occurred.

I am not aware of any additional TC positive samples since the BWA at the beginning of September. In addition this address does not appear to be included in the BWA area from August or September.

I await any info from the City on flushing. You may want to ask whether there has been any building work (blight removal) in the area, as contractors have been problematic with hydrant use.

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

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Tuesday, October 14, 2014 1:38 PM
To: Prysby, Mike (DEQ); Busch, Stephen (DEQ)
Subject: Controlled Correspondence RE: Flint drinking water
Importance: High

Hi, Mike. Yep, another complaint about our favorite water supply ☺

Citizen lives at 324 West Jackson Avenue, Flint, 48505

She states, "Water quality is bad since switching to Flint River. My water stinks like sewage at times. I have developed a cough and rash, brown sediment in sink basins and kitchen sink stays backed up. I have written City Hall Water Dept and Council President for help, but no response."

I think the pos bacti/boil water advisory was in Sept, so can I say that bactis in the past few weeks have met State/Fed'l health standards? How's the TTHMs right now? Any other health standards close to being exceeded?

What do you attribute the sewer smell, and the brown sediment to? Has her area been flushed recently?

I will include the phone numbers of the Water Service Center and the Water Treatment plant that you gave me last time we spoke about Flint.

Can I include your phone number as a contact as well?

Thank you!

Jennifer

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Thursday, October 16, 2014 9:39 AM
To: Busch, Stephen (DEQ)
Subject: RE: Flint Water Complaint

Steve—thank you for following up on this. Perhaps the following information will help the Water Service Center contact this citizen. The complete information for the citizen is:

Tokoya Cureton
810.394.2785
Tcicu99@live.com
324 West Jackson Ave
Flint 48505

From: Busch, Stephen (DEQ) [mailto:BUSCHS@michigan.gov]
Sent: Thursday, October 16, 2014 8:12 AM
To: Crooks, Jennifer
Subject: FW: Flint Water Complaint

Jennifer,

As indicated below the City is in the process of following up on this complaint.

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

From: Brent Wright [mailto:bwright@cityofflint.com]
Sent: Wednesday, October 15, 2014 3:01 PM
To: Busch, Stephen (DEQ)
Cc: rbincsik@cityofflint.com; Prysby, Mike (DEQ)
Subject: Re: Flint Water Complaint

Steve,

I had Mike Glasgow check on this and we have no record of any complaints at this address. We are going to make an attempt to visit this citizen, but with no phone number and name it makes it difficult to schedule a visit. At least we will flush and test hydrants in the area.

Thank you

On Tue, Oct 14, 2014 at 1:54 PM, Busch, Stephen (DEQ) <BUSCHS@michigan.gov> wrote:

Rob,

We have been forwarded the following complaint information from EPA. Could you please let us know whether you have received their complaint and provide a summary of any action or communication with the complaintant? Thanks.

Citizen lives at 324 West Jackson Avenue, Flint, 48505

She states, "Water quality is bad since switching to Flint River. My water stinks like sewage at times. I have developed a cough and rash, brown sediment in sink basins and kitchen sink stays backed up. I have written City Hall Water Dept and Council President for help, but no response. "

Stephen Busch, P.E.

Lansing and Jackson District Supervisor

Office of Drinking Water and Municipal Assistance

MDEQ

517-643-2314

--

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: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Thursday, October 16, 2014 10:59 AM
To: Poy, Thomas
Cc: Busch, Stephen (DEQ)
Subject: DRAFT Flint Controlled Correspondence
Attachments: Flint Michigan Control.docx

Importance: High

Please review the control response letter attached. I would like to get this to Eric today for formatting and final preparation for the Tinka's signature.

Thank you!!

Jennifer

Ms. Tokoya Cureton

324 West Jackson Avenue

Flint, MI 48505

Dear Ms. Cureton:

Thank you for your email to President Obama dated October 2, 2014, concerning the quality of the drinking water the City of Flint, Michigan. Your letter was forwarded to me for a response, since the Flint municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency (U.S. EPA).

The source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April this year. The Flint River raw water is a different quality than the Lake Huron raw water; and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the Flint Water Treatment plant to ensure a palatable drinking water is provided to the citizens of Flint. Please note that the use of Flint River water as a source for your drinking water is an interim source; the City of Flint plans to connect to the Karegnondi pipeline which will draw water from Lake Huron, in 2016.

Your letter referred to "bad water quality" since the switch to use of Flint River water as Flint's source of drinking water. My staff contacted the MDEQ District Engineer, Mike Prysby, to discuss the Flint drinking water issues. Mr. Prysby is aware of the multiple complaints from citizens and is working closely with the Flint Water Department to ensure the distribution system and the water treatment processes work more efficiently and more effectively. The MDEQ contacted the Flint Water Department to discuss your concerns and your contact information was provided to them. The Water Department will be flushing water mains and fire hydrants in your neighborhood. For further information, you can contact Mr. Prysby at:

Mike Prysby, District Engineer

Michigan Department of Environmental Quality

Office of Drinking Water and Municipal Assistance, Lansing District Office

P.O. Box 30242

Lansing, Michigan 48909-7742

(517) 290-8817

prysbym@michigan.gov

The most likely cause of the brown water (iron deposits and sediments from the very old cast iron pipes that make up the distribution system in Flint), is incorrect use of fire hydrants by demolition contractors in the area during this time. The fire hydrants are turned on for the contractors to use, and since the water is under pressure, the fast flow of the water scours the insides of the pipes, causing sediment and rust to become free floating. The City conducts this type of cleaning of the pipes in a regulated/controlled process, and requires about ten minutes at least for all the sediment to be flushed out of the water main. However, the contractors do not always let the water flush for ten minutes, thus sediment remains in the water main. The City's flushing of the water mains in your neighborhood should alleviate the sediment and brown water issues.

Telephone numbers for you to call if your have further concerns:

Flint Water Service Center deals with problems in the distribution system: 810-766-7202

Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: 810-787-6537

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka Hyde, Director

Water Division

cc: Mike Prysby, MDEQ

Steve Busch, MDEQ

bcc: J. Crooks, GWDWB

T. Murphy, GWDWB

AX-15-000-0379-WH

Rennaker, Joanne (DEQ)

From: Busch, Stephen (DEQ)
Sent: Thursday, October 16, 2014 9:18 AM
To: Crooks, Jennifer; Prysby, Mike (DEQ)
Subject: RE: Another Flint complaint

Jennifer,

Here is some info on the chloride issue GM has indicated regarding water in Flint and Mike's discussion with the reporter below. As we discussed we do not follow the secondary MCL's in Michigan, but even if we did these levels are well below the secondary level for chloride.

http://www.mlive.com/news/flint/index.ssf/2014/10/gms_decision_to_stop_using_fli.html

http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html

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

From: Prysby, Mike (DEQ)
Sent: Monday, October 13, 2014 3:48 PM
To: Busch, Stephen (DEQ); Shekter Smith, Liane (DEQ); Wurfel, Brad (DEQ); Feuerstein, Heather (DEQ); Willard, Veronica (DEQ); Benzie, Richard (DEQ)
Subject: Media Inquiry

Ron Fonger from the Flint Journal called me today concerning the GM Engine manufacturing plant in Flint and their intent to temporarily terminate water service from Flint and purchase water from Genesee County (via Flint Twp) until Flint is either treating water from KWA or reducing their chloride concentration from their treated water that meets GM's limit for manufacturing. Ron asked if elevated chlorides are a health concern in Flint. I looked up Flint's MOR and noted that the treated water chloride concentration leaving the WTP ranges between 55 and 65 mg/l which, although not optimal (optimal being <20 mg/l), is satisfactory. Concentrations > 250 mg/l become objectionable due to taste & corrosion issues; however, based on the concentration leaving the WTP, we did not have any health-effect concerns. Ron was not able to recall the maximum chloride level acceptable to GM; however, I stressed the importance of not branding Flint's water as "corrosive" from a public health standpoint simply because it does not meet a manufacturing facility's limit for production. Ron also asked if the treatment process adds chloride. I explained that their primary coagulant is ferric chloride and this does add some chloride to the finished water; however, raw water chloride concentration is generally in the mid 40s mg/l; thus, the contribution from ferric chloride is not significant.

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

From: Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]
Sent: Thursday, October 16, 2014 8:45 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Subject: Another Flint complaint

This complaint came thru the SDWA Hotline. Interesting—this citizen reported that General Motors shut off their line to Flint water due to over-chlorination. See the link below.
Jennifer

From: Poy, Thomas
Sent: Wednesday, October 15, 2014 12:07 PM
To: Crooks, Jennifer
Subject: FW: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan

Jen: Can you use the same reply for the control to reply to this similar complaint about Flint water?

Thanks.

Tom

Tom Poy
Chief, Ground Water and Drinking Water Branch
USEPA - Region 5
(312) 886-5991

From: howard.donna@epa.gov [mailto:howard.donna@epa.gov]
Sent: Wednesday, October 15, 2014 11:46 AM
To: Poy, Thomas
Subject: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan

10/15/2014

SUBJECT: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan
FROM: howard.donna@epa.gov
TO: poy.thomas@epa.gov
CC:

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

10/14/2014 9:07 AM

HQ LEAD NUMBER: FY15-122649-3715-CV

SUBJECT: Referred to Region - Michigan

FROM: janburgess52@comcast.net

TO:

Name: Jan Burgess

Address: 720 Commonwealth Ave

City: Flint

State: Michigan

Zip: 48503

Phone: 810-235-6530

Alleged Violator's Name: City of Flint

Alleged Violator's Address: 1101 S. Saginaw St.

Alleged Violator's City: Flint

Alleged Violator's State: Michigan

Alleged Violator's Zip: 48502

Tip or Complaint: Earlier this year, the City of Flint, MI changed its water supply from the City of Detroit [Lake Huron] to the Flint River. This river has a very long history of pollution. Since this change, our drinking water has tripled in cost and the quality varies daily. Some days it smells like an over-chlorinated swimming pool; other days, like pond scum. It often is brown in color and frequently has visible particles floating in it. We've been under several boil water advisories due to e-coli contamination. Just this morning our local paper reports that General Motors Engine plant has shut off Flint River water to the plant due to the over-chlorination and the fears that the water will cause corrosion. http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html#cmpid=nsltr_stryheadline. People in Flint have had to resort to buying bottled water or having purification systems installed in their homes. Some residents have even had private wells dug. The water is not safe to drink, cook or wash dishes with, or even give to pets. We worry every time we shower. The City of Flint is still very economically depressed and most citizens cannot afford to do anything other than use the river water. Many of them have NO water at all due to the extremely high water bills. There is reasonable suspicion that reports have been falsified. Some residents have had water tested privately and the results are not even close to those reported by the City. Calls to the City and State have resulted in no action whatsoever.

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? No

Rennaker, Joanne (DEQ)

From:	Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent:	Thursday, October 23, 2014 4:04 PM
To:	janburgess52@comcast.net
Cc:	Poy, Thomas; Howard, Donna; Prysby, Mike (DEQ); Busch, Stephen (DEQ); Porter, Andrea
Subject:	Flint, Michigan Citizen complaint - Drinking water quality and Chloride levels

Dear Ms. Burgess: You stated below that GM is not using the treated Flint water anymore because of higher chloride levels, which is correct. If you read thru the article link that you sent me or the links below, the Michigan Dept of Environmental Quality (MDEQ) clarified that the higher chloride levels are most likely coming from the City's treatment of the Flint River water with Ferric Chloride, which acts as a coagulant to help remove suspended and dissolved solids and contaminants. A chloride is a salt compound resulting from the combination of the gas chlorine and a metal. As EPA explains (see: http://water.epa.gov/drink/contaminants/secondarystandards.cfm), chlorides cause corrosion.

The Secondary Maximum Contaminant Levels (SMCL) listed in the Federal regulations at 40 CFR 143.3, are levels of contaminants that represent reasonable goals for drinking water quality, and are not enforceable by the State or the Federal governments. The SMCL for chloride is 250 milligrams per liter (mg/L). The MDEQ reports that the chloride levels in the Flint drinking water are approx. 50-60 mg/L which are acceptable levels, based on the SMCL of 250 mg/L. However, it appears General Motors requires a source of water with chloride levels below 20 mg/L.

Chlorine reacts with water to create different species of compounds that serve as disinfectants and acts to oxidize viruses/bacteria, so chlorine is not the same as chloride.

http://www.mlive.com/news/flint/index.ssf/2014/10/gms_decision_to_stop_using_fli.html

http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html

Secondly, your email refers to the poor quality of the Flint drinking water. The source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April this year. The Flint River raw water is a different quality than the Lake Huron raw water; and requires additional treatment to ensure an acceptable quality drinking water. The MDEQ has been working closely with the Operator-in-Charge at the Flint Water Treatment plant to ensure a palatable drinking water is provided to the citizens of Flint. Please note that the use of Flint River water as a source for your drinking water is an interim source; the City of Flint plans to connect to the Karegnondi Water Authority pipeline which will draw water from Lake Huron, in 2016.

The MDEQ is aware of the multiple complaints from citizens and is working closely with the Flint Water Department to ensure the distribution system and the water treatment processes work more efficiently and more effectively. For further information, you can contact Mike Prysby at:

Mike Prysby, District Engineer
Michigan Department of Environmental Quality
Office of Drinking Water and Municipal Assistance, Lansing District Office
P.O. Box 30242
Lansing, Michigan 48909-7742

(517) 290-8817
prysbym@michigan.gov

The most likely cause of the brown water (iron deposits and sediments from the very old cast iron pipes that make up the distribution system in Flint), is incorrect use of fire hydrants by demolition contractors in the area during this time. The fire hydrants are turned on for the contractors to use, and since the water is under pressure, the fast flow of the water scours the insides of the pipes, causing sediment and rust to become free floating. The City conducts this type of cleaning of the pipes in a regulated/controlled process, and requires at least ten minutes for all the sediment to be flushed out of the water main. However, the contractors do not always let the water flush for ten minutes, thus sediment remains in the water main. The City's flushing of the water mains should alleviate the sediment and brown water issues. You can contact the Flint Water Service Center to request that your lines be fully flushed.

Telephone numbers for you to call if you have further concerns:
Flint Water Service Center deals with problems in the distribution system: 810-766-7202
Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: 810-787-6537

If you have additional questions, please contact me at (312) 886-0244 or crooks.jennifer@epa.gov.

Jennifer Kurtz Crooks
Michigan Program Manager
Ground Water and Drinking Water Branch
United States Environmental Protection Agency, Region 5
77 West Jackson Blvd, WG-15J
Chicago, Illinois 60604
312.886.0244
crooks.jennifer@epa.gov

From: howard.donna@epa.gov [mailto:howard.donna@epa.gov]
Sent: Wednesday, October 15, 2014 11:46 AM
To: Poy, Thomas
Subject: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan

10/15/2014

SUBJECT: FWD: (SDWA - FY15-122649-3715-CV) Referred to Region - Michigan
FROM: howard.donna@epa.gov
TO: poy.thomas@epa.gov
CC:

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

10/14/2014 9:07 AM

HQ LEAD NUMBER: FY15-122649-3715-CV

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Tip or Complaint: Earlier this year, the City of Flint, MI changed its water supply from the City of Detroit [Lake Huron] to the Flint River. This river has a very long history of pollution. Since this change, our drinking water has tripled in cost and the quality varies daily. Some days it smells like an over-chlorinated swimming pool; other days, like pond scum. It often is brown in color and frequently has visible particles floating in it. We've been under several boil water advisories due to e-coli contamination. Just this morning our local paper reports that General Motors Engine plant has shut off Flint River water to the plant due to the over-chlorination and the fears that the water will cause corrosion. http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html#cmpid=nsltr_stryheadline. People in Flint have had to resort to buying bottled water or having purification systems installed in their homes. Some residents have even had private wells dug. The water is not safe to drink, cook or wash dishes with, or even give to pets. We worry every time we shower. The City of Flint is still very economically depressed and most citizens cannot afford to do anything other than use the river water. Many of them have NO water at all due to the extremely high water bills. There is reasonable suspicion that reports have been falsified. Some residents have had water tested privately and the results are not even close to those reported by the City. Calls to the City and State have resulted in no action whatsoever.

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? No

Rennaker, Joanne (DEQ)

From: Prysby, Mike (DEQ)
Sent: Thursday, November 13, 2014 10:01 AM
To: Busch, Stephen (DEQ); Benzie, Richard (DEQ)
Cc: Shekter Smith, Liane (DEQ)
Subject: RE: Flint

My call to Tom Poy went as follows:

- **Duration of drinking water advisory has been ongoing for several months.**

  Complainant may have misunderstood the 30-day TCR violation notices as a continuation of the contamination and BWA. The city issued two of these notices for the TCR violation that occurred in August and again in September.

- **Main breaks are repaired only after the pressure of media coverage.**

  We could not confirm this; however, we maintain frequent contact the city Water Service Center (Dist OIC) concerning main breaks and valve repairs. Visible main breaks are repaired as soon as possible.

- **Animal mortality is associated with drinking Flint water.**

  We could not confirm this.

- **Drinking water advisories were issued only at certain public schools.**

  The BWA issued in September affected approx. one sixth of the city's land area; thus several public schools were likely impacted. The public schools outside of the affected area were not impacted by the BWA and precautionary measures were not required.

- **Water is trucked into City Hall.**

  We are not aware of this. We are certain that city hall remains connected to Flint's distribution system and obtains water from the WTP. It is possible that city hall employees bring in their own bottled water (for personal preference) or a water dispenser may be utilized.

Michael Prysby, P.E.
District Engineer

Office of Drinking Water and Municipal Assistance
517 290-8817

From: Busch, Stephen (DEQ)
Sent: Thursday, November 13, 2014 9:16 AM
To: Benzie, Richard (DEQ)
Cc: Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)
Subject: RE: Flint

FYI.

Mike called Tom Poy yesterday and spoke to him regarding the complaint detailed below.

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

From: Poy, Thomas [mailto:poy.thomas@epa.gov]
Sent: Wednesday, November 12, 2014 2:38 PM
To: Benzie, Richard (DEQ); Crooks, Jennifer
Cc: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)
Subject: RE: Flint

Liane/Richard: FYI..Someone called the EPA Office of Inspector General's hotline with a complaint about Flint's drinking water. The OIG forwarded a log of the call with the name of the complaintant redacted.

Complaint Details
Summary: Complaintant calling regarding drinking water in Flint, Michigan.
Details: Complaintant states the water in Flint, Michigan is not fit to drink. For several months they have been told by city officials not to drink, bathe or cook with the water. Complaintant states a water scientist advised him that dogs have died and have been buried in the city water. Complaintant states that some of the water mains have been broken for 2 – 3 months and only got fixed when the t.v. crews came and filmed it. Complaintant states the Emergency Manager, Garnelle Early, and the city Mayor, Dane Walling stated the city was paying too much to get their water from Detroit and that they need get it from Parragondy Water Pipe Line. Complaintant states the Mayor is President of the Parragondy Water Pipe Line. Complaintant states the Mayor's children go to a public school and that their school has been advised not to drink the water and for the students to bring their own drinking water and the other public schools have not been told this. Also that water is trucked into city hall.

I know that you and your staff have been working with the Flint utility on their water quality and distribution system issues. Have you heard about one school being advised not to drink the water while the others have not? Or city hall getting alternate water?

Tom

Tom Poy
Chief, Ground Water and Drinking Water Branch
USEPA - Region 5
(312) 886-5991

From: Benzie, Richard (DEQ) [mailto:BENZIER@michigan.gov]
Sent: Thursday, November 06, 2014 9:10 AM
To: Poy, Thomas; Crooks, Jennifer
Cc: Busch, Stephen (DEQ); Prysby, Mike (DEQ); shekterl@michigan.gov
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: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Wednesday, February 11, 2015 11:49 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ)
Cc: Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ)
Subject: Controlled Correspondence from citizen in Flint
Attachments: Flint Michigan Control 2 Feb 2015.docx

Importance: High

Hi, Steve. As we discussed, I've drafted our response and included information you gave us on Monday. Tom Poy has reviewed, so this is our final draft. If you could get back to me this afternoon with any changes, I'd appreciate it. These things are like ticking time bombs around here.

Thank you!

Jennifer

Mrs. Stephanie Pumfrey
4071 Mitchell Drive
Flint, Michigan 48506

Dear Mrs. Pumfrey:

Thank you for your January 9, 2015 email to President Obama concerning the quality of the drinking water in the City of Flint, Michigan. Your email was forwarded to me for a response, since the City of Flint's municipal water supply is located within the geographical boundaries of the Region 5 office of the U.S. Environmental Protection Agency (U.S. EPA).

To summarize the background of your concerns with the City of Flint's drinking water, the source of drinking water for the City of Flint was changed from Detroit (which comes from Lake Huron) to the Flint River at the end of April 2014. The quality of the water in the Flint River is different than that from Lake Huron; and requires additional treatment to ensure an acceptable quality drinking water. The Michigan Department of Environmental Quality (MDEQ) has been working closely with the Operator-in-Charge at the City of Flint's Water Treatment plant to ensure that the citizens of Flint are provided drinking water that meets health standards. As you stated in your letter, the use of Flint River water as a source for your drinking water is an interim source; the City of Flint plans to connect to the Karegnondi pipeline, which will draw water from Lake Huron, in 2016.

My staff contacted the MDEQ Supervising District Engineer, Steve Busch, to discuss the City of Flint's drinking water issues. Mr. Busch is aware of the multiple complaints from citizens; he and his staff are working closely with the City of Flint's Water Department to ensure the distribution system and the water treatment processes work more efficiently and more effectively. The most recent laboratory analyses obtained from MDEQ of the City of Flint's drinking water indicate that almost all regulated contaminants meet State and Federal health standards, as required under the Federal and Michigan Safe Drinking Water Acts. It is true that the City of Flint exceeded the maximum contaminant levels (MCL) for *E. coli* in August 2014, for total coliform bacteria in September 2014, and total trihalomethanes (TTHM) in the fourth quarter of 2014. The City of Flint conducted the proper follow-up to these violations as required by Federal and State regulations. The City of Flint has returned to compliance the two bacteria MCL violations that occurred in August and September 2014.

The TTHM violation is based upon the average of data from four quarters for each sampling location. The initial monitoring in early summer reported significantly elevated levels of TTHM compounds throughout the City's distribution system. The MDEQ's Lansing District office advised the City that it needed to immediately implement operational techniques at the drinking water treatment plant and in the distribution system to reduce the formation of TTHM compounds. The City of Flint's actions have reduced TTHM concentrations to the point where the most recent results at seven of the eight sample locations are below the drinking water health standard. Even though the current results for TTHMs meet standards, the TTHM health standard is based on the average of four quarters of data. Because of the earlier high values, it is likely to be another three to six months before the average at each sample location will meet the TTHM health standard. Until then, the City must continue to provide quarterly public notification, as it

continues to work with the MDEQ engineers to reduce the TTHM levels within the distribution system.

For your information, I have included health effects information of TTHM compounds.

"Some 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."

For further information regarding MDEQ's oversight and assistance to the City of Flint regarding its water quality, you can contact Mr. Busch at:

Steve Busch, Supervising District Engineer
Lansing District Office
Office of Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
P.O. Box 30242
Lansing, Michigan 48909-7742
(517) 643-2314
buschs@michigan.gov

In your email, you suggested that the source of drinking water should be switched back to Detroit drinking water which comes from Lake Huron. Unfortunately, U.S. EPA does not have the authority to require the City to change its source of drinking water back to Detroit drinking water. The decision to change the source of the City of Flint's drinking water was a local decision, and continues to be a local decision only

Your email also stated that you are paying high monthly bills for drinking water. A part of the water rate is based upon the amount of water the resident is using; however, the base rate/service charge includes debt service charges and operation and maintenance costs of the water supply. There is currently no Federal or State regulatory oversight of water utility rates in Michigan.

Telephone numbers for you to call if you have further concerns about your drinking water quality:

Flint Water Service Center deals with problems in the distribution system: (810) 766-7202

Water Treatment Plant deals with the actual treatment of the water prior to its pumping into the distribution system: (810) 787-6537

We appreciate your interest in this matter. If you have additional questions, please contact Jennifer Crooks of my staff at (312) 886-0244 or crooks.jennifer@epa.gov.

Sincerely,

Tinka G. Hyde
Director, Water Division

cc: Mike Prysby, MDEQ
Steve Busch, MDEQ
Richard Benzie, MDEQ

bcc: J. Crooks, GWDWB
T. Murphy, GWDWB

Rennaker, Joanne (DEQ)

From: Crooks, Jennifer <crooks.jennifer@epa.gov>
Sent: Thursday, July 16, 2015 8:50 AM
To: Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)
Cc: Philip, Kris (DEQ)
Subject: FW: Flint Water Question from a Pregnant Flint Resident

FYI—our response to a citizen complaint from Flint.
Jennifer

From: Mona Munroe-Younis [mailto:mona.m.younis@gmail.com]
Sent: Thursday, July 16, 2015 7:45 AM
To: Bair, Rita
Cc: Crooks, Jennifer; Deltoral, Miguel; Harris, Kimberly; Porter, Andrea
Subject: RE: Flint Water Question from a Pregnant Flint Resident

Hi Rita,

Thank you very much for your detailed response. It is helpful and I appreciate it greatly.

All the best,
Mona

On Jul 14, 2015 5:22 PM, "Bair, Rita" <bair.rita@epa.gov> wrote:

> We are responding to your email of July 11, 2015 to Miguel Del Toral. He is out of the office today, but has provided the following information to your lead questions. Overall, he agrees with Marc's responses on the water filter. Filters that are certified to remove lead are typically designed to remove 99 percent of the lead. They are also designed with additional capacity as a safety measure, but you should still change the filter in accordance with the manufacturer's instructions. If you identify elevated lead levels from other taps that do not have water filters, we suggest either adding a filter to those, such as the bathroom tap, or only using the filtered tap water for consumption.
>
> If you are still interested in having your water tested you should use a laboratory that has been certified by the State for drinking water analyses (a list is available from the following link: http://www.michigan.gov/deq/0,4561,7-135-3307_4131_4156-36940--,00.html. Please note that a first-draw sample, regardless of pre-flushing, is best for identifying lead that comes from the faucet and other in-home piping or fittings close to the faucet. First-draw sampling does not give a good indication of the lead contribution from sources further from the faucet (i.e. lead service line, leaded brass meter, etc.). Information for residents about first-draw sampling instructions can be found on the last page of the 2006 memo on aerators and LCR sampling at the following link: http://www.epa.gov/ogwdw/lcrmr/pdfs/memo_tapsamples-aerators_10202006.pdf. In addition, below are two graphics from our Region 5 website with information about how to identify if you have a lead service line coming into your home and for faucets that do not have filters on them, how to clean the aerators.

Regarding your TTHM question, EPA has considered developmental and reproductive risks from multiple intake routes of exposure (e.g., ingestion, inhalation, and dermal) in our 2006 Disinfectants and Disinfection Byproducts (DBPR) rule. Some studies did suggest associations between TTHM exposure and various adverse reproductive and development health effects. However, studies available overall showed inconsistent results. As such, our Agency could not conclude whether exposure to TTHMs could cause adverse reproductive/developmental health effects. However, we did note in our findings that there was the potential for concern.

Currently, we are in the process of re-evaluating our DBPR rules and considering new toxicological data regarding reproductive and developmental health effects. Until our evaluation is complete, pregnant women can elect to take additional precautionary measures such as taking shorter showers, venting the room while showering/bathing, and not ingesting water with high TTHM concentrations.

We hope this information is helpful to you.

Rita D. Bair

Section 2 Chief

Ground Water and Drinking Water Branch

USEPA-Region 5

phone: (312) 886-2406

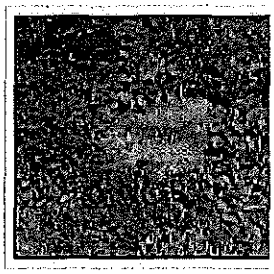
fax: 312-692-2132

What do lead service lines look like?

Lead service lines are generally a dull gray color and are very soft. You can identify them easily by carefully scratching with a key. If the pipe is made of lead, the area you've scratched will turn a bright silver color. Do not use a knife or other sharp instrument and take care not to puncture a hole in the pipe.

Lead service lines can be connected to the residential plumbing using solder and have a characteristic solder "bulb" at the end, a compression fitting, or other connector made of galvanized iron or brass/bronze.

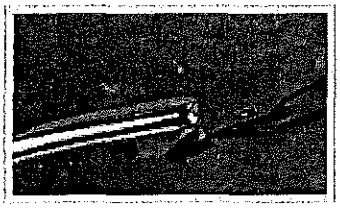
Lead service lines often end just inside the front or side wall of the home, but may extend further into the building as shown, where the lead service line comes out of the basement floor to the water meter and then back into the floor, continuing further into the building.



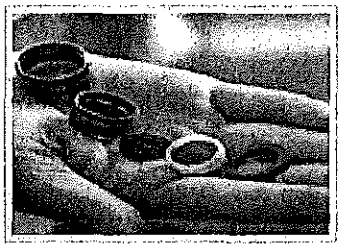
If your home has a wat meter, your water mete may be in your home o "meter pit" or "meter va as shown above.

Cleaning aerators

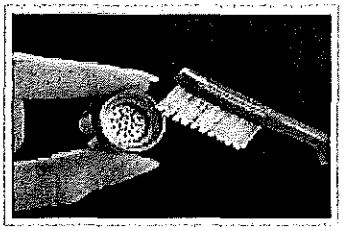
Many taps have an aerator as part of the faucet assembly. Aerator screens are not intended to remove contaminants in water, but may trap sediment or debris as water passes through the faucet. Lead-bearing sediment may end up in drin water from physical corrosion of leaded solder and can build up in the aerator over time.



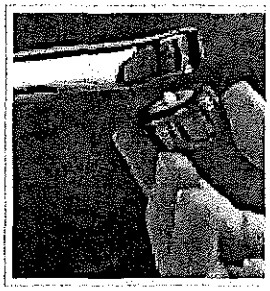
1. Remove the aerator by twisting off with hands or pliers.



2. One or more parts are contained within the aerator. Note the order and orientation of the parts as you remove them.



3. Rinse the pieces with water and brush off the debris. For deposits that are difficult to remove, soak the parts in water for a few minutes and scrub with a toothbrush. Backwashing aerator components is also an effective cleaning method for many aerator types. Hold the removed aerator upside down under flowing water to backwash screens and mesh filters.



4. Reassemble the aer screw it back onto the and hand-tighten. If ar parts are cracked or broken, replace them. washer has hardened should be replaced.

From: Mona Munroe-Younis [mailto:mona.m.younis@gmail.com]
Sent: Saturday, July 11, 2015 5:57 PM
To: deltoral.miguel@epa.gov; edwardsm@vt.edu
Subject: Flint Water Question from a Pregnant Flint Resident

Dear Dr. Edwards and Dr. Del Toral,

Thank you for the work you have already done in my city to protect families from water contaminant exposure. I am a Flint resident, pregnant with my first child, and therefore advised to drink a whopping 10-16 cups of water each day. I am writing to see if you can shed some light or point me to another source for answers regarding water testing and the safest option for staying hydrated.

If your wife or sister or friend were living in Flint and pregnant, what course of action would you recommend she take? Here is my situation:

- A little background: Prior to becoming pregnant, I installed a pur advanced water filter on our kitchen faucet and always use it when drinking from the tap, which I do frequently. (According to the pur website, the filter is said to filter out 70+ chemicals. Recently, I contacted the company to request more information on exactly what chemicals are filtered and up to what level, and am awaiting their reply.) When using the filter, the water is crystal clear, free of the river smell and without the slight yellow tinge that we sometimes have coming out of the tap (unlike in our bathroom sink which I use to brush my teeth...). I was compelled to purchase the filter because my legs began to swell after Flint changed to the river water, and after installing the filter this problem went away. I even tested the difference by drinking filtered water some days (consistently no swelling) and and unfiltered water others (consistent swelling) for a week or two. I understand the swelling to be the result of sodium chloride in our water which is corrosive enough to make GM stop using Flint water in their local plant (http://www.mlive.com/news/flint/index.ssf/2014/10/general_motors_wont_use_flint.html)

- Given your findings of high levels of lead in some residents' water, my husband strongly believes that I should cease drinking all Flint water and drink bottled water instead. However, I have read extensively about safety concerns of plastic-bottled water (chemists who work with plastics avoid drinking it) and this does not seem to be a safer option despite frequent bottled water drives organized by well-meaning activists across Flint.

- I would like to test our house's tap water with and without the kitchen filter using an independent lab, but my husband thinks this will be a futile effort because we have no reliable way of knowing if the results on one day will be consistent with results on other days, such as if the City of Flint were doing some special change to the water treatment procedure. Would testing multiple times across several weeks be sufficient to address this possibility? If so, how many times and at what interval would you

recommend testing, and can you recommend a testing lab? If a high level of lead is discovered, who should we contact to determine where the lead is coming from as a next step?

- According to the consultant that Erin Brockovich sent to Flint earlier this year (http://www.mlive.com/news/flint/index.ssf/2015/02/tthm_how_worried_should_flint.html), total trihalomethanes (TTHM) in the water are dangerous to pregnant women through inhalation exposure during hot showers. (And pregnant women tend to appreciate long, hot showers because our backs are constantly aching!) At this point, the lead issues seem more frightening, though we are considering investing in a costly whole-house water filtration system to deal with both. How can we determine the relative risk to pregnant women for lead in the water vs. TTHMs? I suppose that could differ from house to house. What sort of whole-house filtration would you recommend?

- Are there any other considerations that you think I should keep in mind?

Even for those residents who are privileged to be educated and able to afford water filtration devices, the public water issues we are living with are confounding. The information we receive about our public water supply tends to be fragmented and coming from local public officials who have an interest in downplaying public concerns. In the meantime, it is very difficult to make truly informed decisions about our health.

Thank you in advance for any insights you can share and helping to give my baby a good start in life. I understand if you need to respond as a fellow resident of the world and as experts in general rather than as affiliates of the organizations in which you are employed.

Thank you much,

Mona Munroe-Younis

2721 Indian Bow Trail, Flint, MI 48507

(810) 845-4633

Rennaker, Joanne (DEQ)

From: Busch, Stephen (DEQ)
Sent: Monday, August 18, 2014 1:05 PM
To: Prysby, Mike (DEQ)
Subject: FW: Email Inquiry - Community Drinking Water Contamination Complaint
Attachments: Email Inquiry

Importance: High

Mike could you please respond to the attached complaint. I would suggest via the phone number provided.

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

From: deq-assist
Sent: Monday, August 18, 2014 12:52 PM
To: Busch, Stephen (DEQ)
Subject: FW: Email Inquiry - Community Drinking Water Contamination Complaint
Importance: High

Good Afternoon Stephen,
Please review and respond to the customer email attached, or if you determined it appropriate please forward to other staff for response.

Thank you for you assistance.

Tonya

Tonya Schelter, Department Analyst
Michigan Department of Environmental Quality
Office of Environmental Assistance
Environmental Assistance Center 1-800-662-9278
517-284-6873
Deq-assist@michigan.gov
scheltert@michigan.gov
517-284-7272 SARA Title III Program Phone
Deq-sara@michigan.gov

Thanks for contacting our Department of Environmental Quality, Office of Environmental Assistance. To help us improve our services, we encourage you to complete our short customer service survey https://www.surveymonkey.com/s/oeacs

Rennaker, Joanne (DEQ)

From: BadAddress
Sent: Monday, August 18, 2014 10:59 AM
To: deq-assist
Subject: Email Inquiry

CompanyName:
FirstName: Raney
LastName: Russell
Email: raneyrussell@gmail.com
DayPhone: 810-407-0513
AltPhone:
Address: 2405 E. Court Street
City: Flint
State: MI
ZipCode: 48503
County: Genesee
YourMessage: I have it on good authority that the Flint City Council members are trying to cover-up a larger drinking water contamination, than that which was originally reported. On August 12, 2014 the new Flint Water Treatment Plant discharged a large amount of sewage into the Flint River (the same river where it gets its water). On August 16, 2014 the Flint Journal reported that a small area of the city's water was contaminated and that there is a boil advisory until further notice. The water in that area was found to have E. Coli. However, several people from areas in Flint, which are not under the boil water advisory, are getting sick. Three neighbors in the College/Cultural area in Flint, MI, 48503 are violently ill, reporting flu like symptoms. A dog has died and 2 dogs are ill in the area of Simcoe Ave, Flint, MI 48507, from cons uming tap water. This issue is wider than the city is reporting and it needs to be investigated immediately.

1/16/2015

9:40
Fwd. From Carolyn Looney VM to call back

- Increased heartburn
  - Doctor said don't drink
- Bladder Flare up since on Flint water
- Granddaughter

VM 11:11 AM
12:20 called
- Mindy Blasdell
  (810)-814-3938
  - Bladder condition worse from water
  - IC
Daughter → Rash from bathing

000190

9/18/2015

Forwarded from Lois Graham Via email
Delores Dotson

Called Delores 11:50
- shut down all bathtubs?
- No outstanding concerns just adjusting treatment
- if concerned about lead contact city to come out and sample
- lead in home/property not in City's water
- City oversees system
asked for OIC phone # (provided)

5/29/2015

- VM Donald Moore
  810-743-9511
  Flint Water Quality
  541 Dell Avenue

9:06 Called
- Smells like sewer
- Rashes
-

- Saginaw + Red Arrow
  - Park GM - EPA cleanup

9:35
- Called Brent Wright, Flint WTP
  - Ozone → Maintenance
  - Follow

5/29 Don Moore, Called
810-743-9511
House Phone
~~No Number Given~~
email

5/29 Jason Pendergrass
DW
Flint Taste + Odo.
810-336-5841

9/29/2015

VM 9/28 2:41

Jay, Flint MI

Dog 80-3081142

Concerns about Flint Water

regarding dog?

↳ to Mike/Adm

540

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

June 29, 2012

Mr. Kevin Forbes, Utilities Superintendent
Beecher Metropolitan District
G-1057 West Louis Avenue
Flint, Michigan 48505

WSSN # 0540

Dear Mr. Forbes:

SUBJECT: Beecher Metropolitan District (BMD); 2012 Water System Evaluation

This letter confirms my visit on June 14, 2012, with you. The purpose of the visit was to update Beecher Metropolitan District's 2009 Water System Review (WSR). Enclosed with this letter is a copy of the BMD 2012 WSR.

BMD has taken several important steps towards addressing various water system concerns. We are pleased with the completion of the water system reliability study, establishment of a new water rate structure and rate setting methodology, and application for funding through the Drinking Water Revolving Fund (DWRF) program for water system improvements. Based upon the progress that has been achieved, the BMD water system will maintain a **"SATISFACTORY"** rating. Specific water related concerns are discussed in more detail below:

1. BMD increased its water rates in 2011 and also changed its rate setting methodology. The new rate structure was established according to the recommendations made by your consultant and from the Financial Assessment that was recently prepared by our office. The new rate structure is expected to allow BMD to maintain capital improvements on a yearly basis. Also, BMD anticipates funding through the DWRF loan program to complete additional water system improvements.

   However, BMD will continue to face the challenge in meeting the demands of maintaining existing infrastructure and replacing infrastructure that has reached the end of its useful service life. This will be especially true if BMD's customer base continues to decline. As we discussed, additional distribution system capital improvements will be needed beyond the DWRF project. BMD will need to evaluate the performance of the new water rate structure and to determine if and when rate adjustments are necessary to allow for further water system capital improvement projects. Finally, we encourage BMD to establish a water distribution system capital improvement program (CIP). The CIP should be

based upon the improvements recommended in the reliability study. The projects should be scheduled based upon the priority assigned in the study and other utility projects in the area (road re-construction, sewer replacement, etc).

2. BMD maintains an active Cross Connection Control Program (CCCP). One of the critical program elements consists of testing all testable backflow prevention devices within a three-year period. Confirmation of device testing is typically completed as part of the routine inspection and/or when the customer files a test report from a certified tester with the local water utility. According to BMD's annual cross connection reports, device testing has not been performed since 2006. It is our understanding that BMD has informed its customers with testable devices of the requirement to test their device in 2012. Device testing needs to be completed in 2012, and repeated once every three years in order to maintain a satisfactory CCCP. Finally, any testable device that is located in a high hazard application should be tested more frequently (at least annually).

3. BMD has initiated an upgrade of their existing metering system to a radio read system. BMD's objective is to have one-third of the metering system upgraded to radio-read by the end of 2013. We encourage BMD to follow through and complete the upgrade to radio read since this type of meter read system will significantly reduce the time needed for the water department to conduct routine meter reading. Radio read systems can also improve customer service since unusually high water usage can be detected in a short period of time.

4. The casing vent at Well #4 appears to be capped. A capped casing vent inhibits proper venting of the well casing during the pumping cycle. A properly equipped casing vent (open vent with screen) needs to be provided for Well #4. This work can be completed in conjunction with the pump/motor rehabilitation that will be completed at Well #4 as part of the DWRF project.

Next, as we discussed, BMD has applied for funding through the DWRF program for various water system rehabilitation and main replacement projects. Specific projects include; replacement of iron-removal treatment media, complete replacement of the epoxy coating system for the Penwood Avenue elevated tank, well rehabilitation at Well #4, installation of a SCADA control system, and replacement of approximately 12,000 LF of deteriorated cast-iron distribution system piping. Based upon the Beecher DWRF Project Plan score, chance for funding appears good. We encourage BMD to continue working with the Revolving Loan Section staff towards acquiring the DWRF loan. We also look forward to working with BMD on the technical aspects of the project.

Finally, we received a copy of the summary of the transformer oil (PCB) spill that occurred on March 25, 2012, immediately adjacent to Well #3. As a result of the spill, Well #3 has been taken out of service. Based upon the report, the transformer spill was contained and remediated by removal of the impacted soils and any impact on Well #3 appears unlikely. Well #3 can be placed back into service after confirmation is received from the United States Environmental Protection Agency – Region 5, that no further action at this location is needed.

Should you require further information, please contact me at the telephone number below; via e-mail at prysbym@michigan.gov; or Department of Environmental Quality, P.O. Box 30242, Lansing, Michigan 48909.

Sincerely,

Michael F. Prysby, P.E.
Acting District Supervisor
Resource Management Division
Lansing District Office
(517) 335-6122

mfp:jlr
Enclosure

cc: Mr. Jerry Deloney, BMD

WATER SYSTEM REVIEW

GENERAL

Basic Information

WSSN:	0540	Supply:	Beecher Metro District	County:	Genesee
Date:	6/14/2012	Reviewed by:	MFP	District:	11

Primary Contact:	Kevin Forbes	Copy To:	Jerry Deloney
Title:	Supt.	Title:	Administrator
Telephone:	810-787-6526	Telephone	810-787-6526
Cell Phone:	810-397-1697	Cell Phone:	
Pager:		Pager:	
Fax:	810-787-0050	Fax:	810-787-0050
e-mail:	kevin@beecherwater.us	e-mail:	jerry@beecherwater.us
Address:	G-1057 W. Louis Flint, MI 48505	Address:	Same

Population: 10232 Year: 2010 Basis: 2010 Census

Operator Certification

Distribution Classification: S-2

Operator in Charge:	Kevin Forbes	Cert.:	S-2	OP No: 4493
Other Operators:	Tyrone McCloud		S-3	
	Mark Brandon		S-4	
	Eric Southward		S-4	
	John Waddell		None	

Treatment Capacity: 4.2 MGD

Treatment Classification: D-2

Operator in Charge:	Kevin Forbes	Cert.:	D-2	OP No:
Other Operators:	Tyrone McCloud		Wrote D-4	7902
	Kevin Forbes		D-2	
	Gerald Deloney		D-2	

Ownership

Ownership: Water Metropolitan District (City, Village, Township, County, Authority, Association)

Annual Fee: Active (Active, Inactive, Exempt, Etc.)

Comments: This supply consists of four production wells, one standby well, three iron removal plants, and two elevated storage tanks. Water is distributed through a network of mains ranging between 6 and 12-inches in diameter. Beecher's customer base is primarily residential.

SOURCE

Well Construction and Maintenance

Well Number	3	4	5	6
+ Well Status	op.	op.	op.	op
+ Treatment				
P.O.E. ID #				
+ Treatment				
Year Installed			Late 1950s	1970s
GPS Coordinates Lat.				
Long.				
Grouted?				
Rock or Drift	Rock	Drift	Drift	Drift
Total Depth Ft.	350	125	130	100
Casing Depth				
Casing Diameter in.	10	12	14	8"
Gravel Pack Dimensions				
Gravel Pack Material				
Screen Length				
Screen Diameter				
Screen Slot Size				
Pump Setting				
+ Static Water Level				
+ Pumping Water Level (24hr)				
+ Pumping Water Level (100 day)				
Well Log				
+ Pump Type	V. Turb	V. Turb.	V.. Turb.	V. Turb
Permit Capacity (GPM)				
Permit TDH				
+ Current Capacity (GPM)	260	543	1000	830
+ Basis				
Current TDH	240 ft	110 ft	122 ft	138 ft
HP	40	25	110	80
Last Pulled for Inspection	2003	2007	E. 2006	2002
Last Efficiency Test				
Phase/Surge/Lightening Protection				
Well Seal	y	y	y	y
Casing 12" Above Grade	y	y	y	y
Pump to Waste Piping	y	y	y	y
-Screened or Capped?	n	n	n	n
Air/Vac Relief	y	y	y	y
-Screened?	n	y	n	n
Casing Vent	y	capped	y	y
-Screened?	n	capped	y	y
Check Valve (VT or Sub)	y	y	y	y
Meter	y	y	y	y
Raw Tap	y	y	y	y
Chemical Injection Tap	na	na	na	y
Plant Tap	na	na	na	y
Chemical Feed Outlet	na	na	na	y
Heater	ele.	ele.	ele	ele
Water Level Device	y	y	y	y
Pressure gauge	y	y	y	y
Floor Drain	y	out door	sump	y
Doors open out	in	out	in	out
Phase/Surge protection				
H-O-A Switch	y	y	y	y
Run Timer				
Alternating Relay				

Well Construction and Maintenance Continued

Well Number	7
+ Well Status	st. by
+ Treatment	
P.O.E. ID #	
Year Installed	
GPS Coordinates Lat.	
Long.	
Grouted?	
Rock or Drift	drift
Total Depth Ft.	89
Casing Depth	
Casing Diameter in.	16
Gravel Pack Dimensions	
Gravel Pack Material	
Screen Length	
Screen Diameter	
Screen Slot Size	
Pump Setting	
+ Static Water Level	
+ Pumping Water Level (24hr)	
+ Pumping Water Level (100 day)	
Well Log	yes
+ Pump Type	V. Turb
Permit Capacity (GPM)	
Permit TDH	
+ Current Capacity (GPM)	900
+ Basis	
Current TDH	
HP	75
Last Pulled for Inspection	new in 94
Last Efficiency Test	
Phase/Surge/Lightening Protection	

Well Seal	y
Casing 12" Above Grade	y
Pump to Waste Piping	y
-Screened or Capped?	n
Air/Vac Relief	y
-Screened?	n
Casing Vent	y
-Screened?	y
Check Valve (VT or Sub)	y
Meter	y
Raw Tap	y
Chemical Injection Tap	n
Plant Tap	na
Chemical Feed Outlet	y
Heater	y
Water Level Device	y
Pressure gauge	y
Floor Drain	y
Doors open out	out

Yearly maintenance including packing of stuffing box, replacement of shaft sleeves, re-greasing, and and pump performance testing is performed by Peerless-Midwest. The casing vent at Well #4 has remained capped.

SOURCE

Standby Power

PORTABLE AUXILIARY POWER

Unit Number or Brand	3 & 4, 5, 6			
Power Type	portable			
Power Rating (kWh or KVA)				
Fuel Type	diesel			
Capacity (gpm)				
Horse Power (HP)				
Starting Frequency	sev. times/yr			
Load Testing Frequency	not routinely perf.			

Comments: There are two portable generators available for the facilities at wells 3&4 and 5&6. The generators can operate both the wells and the iron removal plant at each location. The generators are also utilized for the sewer lift stations and they are started once a month. A load test is performed once a year for the generators at the #3 sewer lift station.

Well 7 remains available for emergency stand-by and there are no plans to provide iron removal treatment at this location.

Isolation

Well Number	3, 4	5, 6	7	
GPS Coord. Lat.				
Long.				
Approved Isolation Radius	100	100	100	
Available Isolation Radius	100	100	100	
Type of Isolation Control	muni own	muni own	muni own	
GW flows from/direction				
Basis				
Important Potential Source				
Distance and Direction				
Important Major Source				
Distance and Direction				
Detects				
Sensitivity				
Susceptibility	moderate	moderate	moderate	

Comments:

SOURCE

Capacity (MGD)

Year	Pumpage & Usage Max Day	Date	Avg. Day	Min. Day	Date	Max/Avg	G/C/D	% unacct.H2O
2002	1.970		1.270			1.55	84	
2003	1.910		1.240			1.54	101	
2004	1.970		1.140			1.73	93	
2005	1.610		1.140			1.41	93	
2006			1.050				85	
2007	1.990		1.020			1.95	83	
2008	2.070		1.060			1.95	86	
2009	1.450		0.944			1.54	92	
2010	1.440		0.850			1.69	83	
2011	1.370		0.820			1.67	80	

		Date
Five Year Max. Day	2.070	
Ten year Max. Day	2.070	
Five Year Avg. Day	0.940	
Peak Hour (Hydropneumatic)		

Max Day for capacity requirements: 2.070

Total Well Capacity: 3533 gpm 5.090 mgd

Firm Well Capacity: 2533 gpm 3.650 mgd

Firm Well Capacity/Max. Day: 176.33%

Peak Hour/Firm Capacity: _____ (Hydropneumatic w/o gravity storage)

Total Auxiliary Power Well Capacity: 2605 gpm 3.754 mgd

Aux. Power Well Capacity/Avg. Day: 399%

Basis of Auxiliary Power Waiver

Comments: In addition to stand by power for the individual wells, stand by power also exists for each of the three iron removal plants in the form of a secondary electrical source from a different substation.

Average day and maximum day water usage has decreased over the past 5 years as Beecher's customer base has decreased.

STORAGE

Construction, Controls & Maintenance

	Location: Louis Ave	Location: Penwood	Location:
Volume	0.25 MG	0.5 MG	
Type			
O.F. Elevation			
Date Constructed	L. 1930's	1958	
Date Inspected	2000	2007	
Date Painted Inside	2001	1996	
Paint System		3-coat epoxy	
NSF Std 61 Compliant (Y/N)			
Date Painted Outside	2007	1996	
Cathodic Protection	y	y	
Tank Isolation Valve			
Tank Drain (Hydrant)			
Altitude Valve			
Mud Valve			
High Alarm	y	y	
Low Alarm	y	y	
Type			
Total Head Range (Feet)			
Normal High Water Level			
Normal Low Water level			
Range of Operation			
Normal/Average Pressure			
Chart recorder			
Telemetering System			
Vents Screened			
Overflow Screened			
Access Hatches Locked			
Expansion Collar Lubricated			
Deflection Plate			
Overflow Splash Pad			
Site Fenced/Locked			

Capacity

Usable Storage	750000			
Total Usable Storage	750000	gal	0.750	mgd
Total Usable Storage/Max Day	36%			
Total Usable Storage/Avg. Day	80%			

Comments: Both tanks were inspected in 2000 by Dixon. The Louis Ave tank was repainted (interior) in 2001 and (exterior) in 2007. Also, a new cathodic protection system was installed in the tank. A construction permit was issued in 2009 to repaint the Penwood tank; however, the work was not completed. Beecher has applied for a Drinking Water Revolving Loan (DWRF) loan to have the tank repainted. If funded, Beecher will proceed with the work in 2013.

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies? (Y/N) no

Comments: No further progress has been made with the city of Mount Morris towards providing an emergency interconnection.

Distribution Piping

Identify distribution piping materials - estimate percentages:

Cast Iron	85 %
Ductile Iron	15 %
PVC	0 %
AC	0 %
HDPE	0 %
Galvanized	0 %
Concrete	0 %

Estimated percent of piping with coal tar lining 0 %

Identify distribution pipe sizes - estimate percentages:

2"	0 %	
4"	0.8 %	
6"	69 %	
8"	20.9 %	
10"	0 %	
12"	8.2 %	
16"	From well 7 to dist.	1.10%

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? (Y/N) yes

Comments: East Coldwater Road experiences frequent main breaks
Approximately 70 main breaks per year - system wide basis

Are there areas where aesthetic water quality complaints are frequent? (Y/N) no

Do you receive complaints alleging illness due to the water? (Y/N) no

Are there areas where customers complain of low pressure? (Y/N) no

The water department repairs numerous main breaks each year. A variable frequency drive (VFD) was installed at IR WTP #2's high service discharge. VFDs will also be installed at the other iron removal treatment plants in 2012. This work along with replacement of deteriorated piping within a portion of Beecher's distribution system (as part of the upcoming DWRF project) is expected to reduced the number of watermain breaks.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where fire flows cannot be maintained? yes

Much of Beecher's residential areas are supplied by old 6-inch cast-iron mains that produce less than the 1000 gpm recommended fire flow - based on the hydraulic model used in the 2011 reliability study. Also several commercial areas served by 6-inch main produce less than 2500 gpm of fire flow at 20 psi.

Last ISO report date? 8/1/1989 Rating 7

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading, or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

Location:	Estimated Completion Date

Comments:

A distribution system capital improvements program is not in place, and there has been no additional watermain replacement projects since 2000. The 2011 reliability study recommends replacement of deteriorated watermain in many areas of Beecher's distribution system. Beecher has applied for funding through the DWRF program for replacement of approximately 12,000 LF of 4, 6, and 8-inch watermain. If funded, the project is expected to proceed in 2013.

Beecher has also increased their water rates in 2011 and changed their rate setting methodology as suggested in their most recent rate study and the financial action plan (prepared by the MDEQ). The new rates are expected to provide approximately $100K per year for additional capital improvements.

DISTRIBUTION

Hydrants

Number of Hydrants	421
Number Without Auxiliary Shut-Off Valves	very few
Number that are Self-Draining	85%
Number of Inoperable Hydrants	5-10 - typ. repaired within one week of discovery

Frequency of Hydrant inspection: 1/yr in conj. with flushing

Inspection Staff: Water Dept.

Comments: The water department keeps the fire department updated on the operational status of system hydrants.

Are there areas where additional hydrants are needed? no

Hydrant location system: Card file Accurate? yes

Are hydrants color coded for capacity? yes coded by main size.

12-in WM - Green, 8-in WM - Orange, 6-in WM - Red

Has this information been provided to the fire department? yes

Frequency and seasons of hydrant flushing: 1/yr in fall

Purpose of flushing:

Is the public notified prior to flushing? yes

Does flushing follow a specific format? yes Three separate areas are flushed

Is the volume of water used during flushing estimated? yes

Is a record maintained of hydrant activities? yes

Comments:

Hydrants are color coded according to main size as opposed to their capacity. The water department staff meets with the fire department occasionally to review proper hydrant operation. The number of hydrants will change following completion of the anticpated DWRF project.

DISTRIBUTION

Valves

Number of Valves	528
Number of inoperable valves	several
Are there areas where additional valves are needed?	uncertain
Valve location system	Card File
Accurate?	yes
Valve Turning Frequencies	valves are exercised primarily during repair of mainbreaks
Records Maintained?	yes

Comments:

Valve records are kept as part of the card filing system. The number of valves will change as part of the anticipated DWRF project.

DISTRIBUTION

Customer Service Information

Number of service connections	approx. 3,700
Number of metered service connections	3,700

Identify service line materials and estimate percentages:

Copper	99%
PVC/PE/PB	<1
Galvanized	<1
Lead	

Ownership of Service	(CWS/Customer)
From Corp Stop to Curb Stop	CWS
From Curb Stop to Property Line	CWS
From Property Line to Meter	Customer
Meter	CWS

Customer Meters

Types of meters Used - Neptune 900-I	Disc Compound
Number of Meters with Touch Pads or Other Remote Reading Devices	3,700
Size of Meters	
Residential	3/4"
Industrial/Commercial	1-4"
Meter Testing/Maintenance Program	yes
Average Age of Meter is System	7 yrs
Residential/Commercial/Industrial	
Criteria for Changeout	turn on/off malfunction
Number or Percent Changeout per Year	20%
Master Meter Locations	Wells
Calibration of Master Meters	Water Staff
Meter Reading Staff/Contract:	Water Staff

Percent By Usage	
% Residential	90%
% Commercial	10%
% Industrial	1%
% Other	
% Large Users - List	

Comments: Beecher has started to upgrade their meter program to a radio read system. An initial purchase of 300 radio read meters has been made and 112 meters have been installed so far. The water department's goal is to continue installing 50 radio read meters per month and to have the change-out one-third completed by the end of 2013.

DISTRIBUTION

System Growth

Year	No. of Residential Meters Installed	No. of Comm./Industrial Meters Installed	No. of Construction Permits Issued	Permitted Amount of WM Feet
2001	2 or 3	0	1	tank paint
2002	2 or 3	0	0	0
2003	2 or 3	0	0	0
2004	2 or 3	0	0	0
2005	2 or 3	0	0	0
2006	0	0	0	0
2007	0	0	0	0
2008	0	0	1	tank repaint
2009	0	0	0	0
2010	0	0	0	0
2011	0	1	0	0

Beecher continues to lose residential accounts since 2007. There has also been very little if any commercial development since 2005.

Water Rates

What is your current rate schedule?	$46.23/qtr + 0.96/100 cu ft
Are current rates adequate to support O&M and CIPS?	see comments
When was last time rates were adjusted?	2011
Has a water rate study been performed? When?	2005
Is there a meter charge or ready to serve charge?	yes
Is a copy of the water rate schedule and ordinance available?	yes
Tap-in Fee:	$1,950

Comments: Water rates were increased in 2011. The rate increase was based upon the 2005 water rate study by Rowe and takes into account 2011 dollars. Beecher also replaced their minimum charge for water with a ready to serve charge and is using the rate setting. methodology proposed by Rowe in the 2005 water rate study. The new rate structure is sufficient for O&M and some CIPs. Beecher will evaluate how the new rate structure performs to determine if additional increases are needed for CIPs.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	yes
Repair Clamps (2 or more for each size)	yes
Tees, Crosses & Elbows	yes
Hydrants	yes
Valves	yes
Services (Corp & Curb Stops, Clamps and Lines)	yes
Other	

Safety Issues

Confined Space Entry Program in Place % Followed (Y/N)	yes
Trench Safety Program in Place & Followed (Y/N)	yes

Comments:

PROGRAM COMPLIANCE

Cross Connection Programs

Ordinance No. 31 Date: 4/9/1975

Approved Program (Y/N)? yes Date: 2/18/2003

Staff Assigned to Program, (No., Dept and/or who) DPW

Is Annual Cross Connection report required (Y/N)? yes

Was previous year's annual report received (Y/N)? yes Date Received: 3/21/2012

Was previous year's annual report acceptable (Y/N)? yes

Inspection Status: Active Program

Device Testing Frequency 1/ 3 yrs

Recordkeeping: adequate

Private Well Isolation/Abandonment Procedure:

Comments: Beecher has lost nearly half of its 33 cross connection accounts since 2003. Device testing has not been performed since 2006. A total of 6 devices need to be tested and each account has been informed that their device need to be tested in 2012. The CCCP was recently updated by establishment of a database more maintainingstatus. program compliance.

Annual Pumpage Reports

Is Annual Pumpage Report required (Y/N)? yes

Was previous year's annual report received (Y/N)? yes Date Received: 3/21/2012

Comments:

Monthly Operator Reports

Are Monthly Operation Reports required (Y/N)? yes

Were all previous year's reports received (Y/N)? yes Timely? yes

Are previous year's reports acceptable (Y/N)? yes

Consumer Confidence Reports

Is the annual CCR requires? (Y/N) yes

Was the previous year's report received? (Y/N) yes Timely? yes

Was the previous year's certification form received? (Y/N) yes Timely? yes

PROGRAM COMPLIANCE

Emergency Response Plan

Date of Most Recent Plan: 6/15/2012 Acceptable? yes

Filed where? CWS

Comments: The recently prepared ERP meets our requirements

General Plan

Date of Most Recent Plan: Nov 2011 Acceptable? yes

Filed Where? MDEQ

Comments: The water system general plan was updated as part of the 2011 water system reliability study,

Reliability Study

Date of Most Recent Study: Nov 2011 Acceptable? yes

Filed Where? MDEQ, CWS

Comments: Beecher's reliability study was updated in 2011.

Permits

Applies for and obtains permits prior to construction (Y/N):	Y
Reviews plans from engineers and/or developers prior to submittal to DEQ (Y/N):	
Standard specifications on file at CWS (Y/N):	
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):	
Follows master plan for any construction (Y/N):	
Actually follows plans as permitted (Y/N):	
Develops as-built plans (Y/N):	
Updates general plans (Y/N):	

MONITORING

Bacteriological

Date of Approved Site Sampling Plan :	2012
Are samples still being collected in accordance with the plan? (Y/N)	yes
Number of samples required each month:	10
Basis for Setting Number of Monthly Samples:	
Certified Lab Used:	Flint WTP
MCL, Monitoring or Reporting Violation(s)? (Y/N)	none
Number & Type of Violations in past 12 months	na
Public Notice Issued according to regulations? (Y/N)	na

Chemical

Date of Monitoring Schedule:	Feb 2012	
Are samples still being collected in accordance with the schedule? (Y/N)	yes	
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)		yes
If nitrate detect, what is concentration?	0.4 mg/l	Sample Site
If nitrite detect, what is concentration?	nd	Sample Site
Detects for metals > 50% of MCL? (Y/N)	Y	
Metals (list)	Arsenic (5-8 ppb)	
Detects for VOCs (Y/N)	N	
Detects for SOCs (Y/N)	N	
Date of Approved Disinfection Byproduct Monitoring Plan :		
DBP Sampling Done? (Y/N/Waived)		
If yes, done to site sampling plan? (Y/N)		

Lead and Copper Monitoring

No. of Samples Required:	30
Semi Annual/Annual/Triennial	Triennial
Exceedance of lead or copper action level (Y/N)	n
If yes, was public education issued (Y/N)	n
Next Monitoring Period:	6/1/2013 9/30/2013
Corrosion Control Program, if applicable	na
Lead service line replacement status, if applicable	na

Radiological Monitoring

Date of Monitoring Schedule		Feb 2012	
Are samples still being collected in accordance with the schedule? (Y/N)		yes	
Alpha, beta, radium, uranium	yes	Date Collected	
Radon	no	Date Collected	9/17/2001
Tritium	no	Date Collected	
		Date Collected	

Detects for Rads > 50% of MCL? (Y/N) No rads > 50% of MCL detected at any of Beecher's POEs

Treatment

Iron/Manganese Removal

Water Quality

	Raw Average	Raw Range	Treated Average	Treated Range
Iron (ppm)	1.5	0.7 - 2.5	0.3	0.2 - 0.3

Year Installed: 1987
Rate Capacity: 4.85 MGD (3 I.R. Plants)

Oxidation Method (Air, Chlorine, Permanganate, other): Aeration
If air, capacity of compressors: _____ cfm
Air to water ratio _____ cfm/gpm
Number of Aerators: 3

Comments: An inspection of the aerator and detention tank are conducted at each facility on a yearly basis. The most recent inspection revealed that the aerator screens were in good condition. The aerator trays were replaced with stainless steel trays. The aerator screens are inspected twice a year.

	I.R. #1	I.R. #2	I. R. #3
Detention Tank Volume:	36,000 gal	30,000 gal	25,400 gal
Detention Time at rated capacity:	32.7 min	30.0 min	30.6 min
Rated Capacity (gal)	36000	30000	25400
Detention Time (min)	32.7	30	30.6
Inlet (in)	12	10	10
Outlet (in)	8	8	8

Comments: Each facility has one induced draft aerator followed by one steel detention tank. Chlorine feed was added upstream of the detention tank at Filter Plants No. 1 and No. 3 in order to optimize arsenic removal. The filter media was replaced at IR #3 in Fall of 2010 with torpedo sand as per the manufacturer's recommendations. Beecher applied for funding through the DWRF program for filter media replacement at IR #1 and #2.

Filter Type: Conventional gravity
Filtration Rate: 3 gpm/sqft
Filter Specifications
Number of Cells: 4/unit
Filter Size: IR plants 1 & 2: 400 sq. ft. Plant 3: 324 sq. ft.
Media Depth & Characteristics

		UC	ES
Anthracite	24"	1.7	0.6 to 0.8 mm
Sand			
Gravel			
1/4" - #10	4"	1.7	0.6 to 0.8 mm
1/2 - 1/4"	4"	1.7	0.6 to 0.8 mm
3/4 - 1/2"	4"	1.7	0.6 to 0.8 mm
1 1/2 - 3/4	4"	1.7	0.6 to 0.8 mm

Media	IR 1	IR 2	IR 3
Date Checked	2010	2010	2010
Date Replaced	2002	1999	2010
Underdrain Type	st. steel	st. steel	st. steel

Comments: Routine inspections of the filter media are performed by the water department every other year. The inspection included; measuring the media depth, taking core samples, and checking for media growth. The condition of the detention tank, screens and valves are also checked during the inspection. The filter media at IR #1 and #2 needs to be replaced.

The underdrain system in IR 3 was repaired in 1999. All three underdrains have non-clogging baffle plates that are 12 inches on center.

Backwash

	GPM
IR Plant 1	1200
IR Plant 2	1000
IR Plant 3	850

	IR 1	IR 2	IR 3
Pump Condition	good	good	good
Surge relief			
'-Low Service	air vacuum	air vacuum	air vacuum
'-High Service	none	VFD control	none
Backwash Source	filter	filter	filter
Backwash Disposal	san sew	san sew	san sew
Sludge	na	na	na
Flooding Susceptibility	none	none	none

A VFD was installed to control the high service pump output at IR 2. VFDs will be installed to control high service pump output at IR #1 and #3 later in 2012.

Backwash Requirements

Air Problems	none
Rise Rate	at 1000 gpm (12 gpm/sqft)
Length of Wash	20 min 15 @ wtps
Vol water used	20000 gal
Sand Expansion	na
Bed Expansion	na
Disposal of Backwash	san sew
Criteria for Backwash	headloss

Rate of Flow Devices	
Filtered Water	Orifice Plate Meter
Filter to Waste	V notch weir

Length of Filter Runs

The filter run length has shortened slightly at Filter Plants 1 and 3 due to the prechlorination that was added. Filter runs decreased from 3 million gallons to approximately 2.5 million gallons for each plant.

Associated Problems and Causes

Mudballs	yes
Air Binding	None
Cementing	None
Gravel Mounding	None
Media Loss	< 1/2" since initial inspection
Cracking	None
Media Growth	None
Media Attraction	None
Bacteria Growth	None
Uniform Backwash	yes
General Problems	none experienced

HIGH SERVICE PUMPING

		1	2	3
Pump Number				
Year Installed				
Type		HC	HC	HC
Permit Capacity				
Permit TDH				
Current Capacity	GPM	540-610*	720-750 *	860
Basis				
Current TDH				
HP				
Last Complete Inspection				
Last Efficiency Test				

Comments: Each pump appears to be in good condition and are maintained on a yearly basi The new VFD at IR #2 maintains pump output between 720-750 gpm. The pum output at IR #1 has been throttled to the 540 - 610 gpm range while Well #3 rem out of service due to a PCB contamination clean-up.

Disinfection Points	Available	Normally Used	Periodic Use	Dosage
Wells				
Pre Aerator		IR #1 & 3		1.2 - 1.5
Prefiltration				
Post Filtration		#1,#2, #3		1.00

Plant Piping and Miscellaneous

Pipe Diameter, Identification, etc

All piping within each facility is color coded according to the type of water that it carries.

Plant Controls:

Metering

Raw water pumps are controlled according to the levels in the elevated tanks. A high level control also prevents these pumps from overflowing the detention tanks. A VFD has also been installed to control output at Well #5.

Chemical Feed

Operates in conjunction with flow in the line to which it discharges.

Filters

A headloss gauge is utilized for determining when a backwash is needed. Backwash is performed manually.

High Service Pumps

Are activated when water levels in the detention tanks reach a certain height. These pumps shut-off when filter effluent pressures are low. A VFD is in place at IR #2.

Alarms

Cl Leak

A visible light exists above the chlorine room entrance door and is also tied to a dialer system that sends notice to Beecher's alarm company.

Elevated tank low level - yes
Elevated tank high level - yes

Security

Entry alarms that need to be de-coded upon entry exist at each plant. Each treatment plant is fenced and the entrance gate locks are changed every year.

Flexibility in Operation:

	Unit Bypass	Plant Bypass
Pretreatment	no	yes
Filters	no	yes

The well pumps operate at a ramped down speed to match the design head needed to transmit the raw water to the aerators. To bypass the IR plants, the standby power generators are utilized to produce a full electrical load that allows the well pump to operate at a discharge head that is adequate for the distribution system.

Piping Structural Integrity: Good

Roof Drains: Good Cond

The roof flashing was repaired on all three plants and has eliminated leakage onto the ceiling tiles inside each plant.

Valve Operation 4/20/2006

The Jamesbury valves that were used to throttle finished water output downstream of the high service pumps were replaced with stainless steel valves at all of the filter plants.

Interruptions in Operation: None

TREATMENT

Disinfection

Point of Treatment	IR 1,2 & 3		
Year Initiated			
Purpose	Disinfection, As removal		
Location of Injection Pt.	High service discharge - all wtps		
	Raw water influent - IR 1 & 3		
Compound & Concentration	Cl2 gas		
ANSI/NSF Standard 60 Approval? (Y/N)			
ANSI/NSF Maximum Dosage:		mg/l	
Normal Feed Rate/Dosage	1.2	mg/l	As pre-treatment
Post Filtration Dosage	1.0	mg/l	
Avg Plant Tap Residual (total)		mg/l	
Avg Plant Tap Residual (free)	1.0 - 1.5	mg/l	
Avg Distribution Residual (total)	0.5	mg/l	
Avg Distribution Residual (free)	0.3 - 0.4	mg/l	
Frequency of Residual testing			
Analytical Method Used	Colorimatric wheel		
Any Overfeed Instances? (Y/N)	n		Date(s):
Any Low Feed Instances? (Y/N)	n		Date(s):
Pump Type:			Model:
Pump Capacity		gpd max	
		gpd min	
		psi	

Safety	(Y/N)		(Y/N)
Separate Room	y	Cylinder Repair Kit	y
Exhaust fan	y	Extra Chlorinator or repair kit	y
Fresh Air Vent	y	Ammonia Bottle	
Door Opens Out With Panic Bar	n	Self Contained Air Packs	y
More than 1500 # Cl_2 onsite	n	Training Programs	y
Electrical Protected from Gas?		Shower/Eye Wash	y

Comments:

A visual alarm is in place at each plant and is activated at 1 ppm. This alarm is tied to a dialer system that sends notice to Beecher's alarm company. Automatic light switches do not exist in the plant or outside and adjacent to the chlorine room door. An observation window exists in each plant. Water department staff's most recent safety training was conducted approximately four years ago.

Gas CL2 under vacuum is practiced. Chlorination prior to aeration is utilized at WTPs 1 & 3 to optimize As removal treatment. New chlorine injectors were installed late in 2008 at all of the treatment plants. Water operators are interested in installing new vacuum regulators due to better availability of parts and compatibility with the new injectors. Two 150 lb cylinders are connected at each plant. Each cl system has two rotometers with automatic switch over with a 5-100 lb/day capacity range.

Phosphate Addition - None

Evaluation of Community Water Supply - Water System Review Summary				
Name of Supply: **Beecher Metropolitan District**			WSSN:	0540
County: Genesee			District:	11
Evaluator: MFP			Date:	6/14/2012
Overall Rating	Satisfactory: X	Marginal:	Deficient:	

	N/A	Sat.	Marg.	Def.
General				
Operator Certification		X		
Ownership		X		
Source				
Well Construction & Maintenance		X		
Standby Power		X		
Isolation		X		
Capacity		X		
Storage				
Construction		X		
Controls		X		
Maintenance		X		
Capacity		X		
Distribution				
Interconnections with other Supplies	X			
Pump Stations	X			
Operational Concerns & Maintenance		X		
Hydrants		X		
Valves		X		
Customer Service Information		X		
Program Compliance				
Cross Connections - no device testing since 2006			X	
Annual Pumpage Reports/MORs		X		
CCR		X		
Contingency Plan		X		
General Plan		X		
Reliability Study		X		
Permits		X		
Capacity Development				
Monitoring				
Bacteriological		X		
Chemical		X		
Lead/Copper		X		
Radiological		X		
Treatment				
Disinfection		X		
Phosphate Addition	X			
Fluoride	X			
Iron/Manganese Removal		X		

1720

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

August 27, 2012

Mr. Ed Brown, DPW Supervisor
City of Davison
Water Department
200 East Flint Street
Davison, Michigan 48423

WSSN: #1720

Dear Mr. Brown:

SUBJECT: City of Davison; 2012 Water System Review

This letter confirms my visit on August 1, 2012, with you and Mr. Brian Gist. The purpose of the visit was to update the Davison 2009 Water System Review (WSR). Enclosed is a copy of the Davison 2012 WSR.

The 2012 WSR continues to rate Davison's water system as "**Satisfactory".** This rating is based on the condition that the city updates their 1998 water system Reliability Study. This issue is discussed in more detail below. There are also several other water related issues that need to be addressed, and these are discussed in more detail below.

1. The city was informed in our March 9, 2011, letter of the requirement to update their 1998 water system reliability study. Reliability studies must be updated once every five years. Based upon our discussion, the city has not proceeded in having the study updated.

   As we discussed, the 1998 study needs to be updated in order to maintain compliance Administrative Rule 1203 of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), and to maintain a satisfactory water system rating. The updated study needs to review the city's 5-year and 20-year water use projections, and assess the hydraulic capability of the distribution system. The study also needs to include a revised water system general plan and assess the percent unaccounted water (water loss). Also, given the progress being made in changing out customer meters, an unaccounted water determination should be more easily attainable as part of the Reliability Study. Next, a water system capital improvements program (CIP) should be prepared and should be based upon the findings of the study. Finally, a list of items that should be included in the Reliability Study is enclosed with this letter.

The city needs to update their water system Reliability Study and submit a copy of the study to our office for review by no later than September 30, 2013. Failure to meet this deadline will result in a decline in Davison's water system rating. As always, we are available to meet with you and your consultant to discuss the scope of the study in more detail.

2. Based upon our discussion, the city intends to update their water rate study in 2013. It is also our understanding that the updated study will help support a more active capital improvements program. We encourage the city to proceed with the rate study since it appears that the current water rate is marginal in supporting water system capital improvements.

   Next, as part of updating the water rate study, the city should proceed with an evaluation of water rates and prioritization of water system improvements as part of an overall asset management plan. Davison's water system, especially the distribution system, may be the city's most extensive and expensive asset. We strongly encourage Davison to consider using asset management principals to help evaluate the distribution system, determine the 20-year needs, and establish the means to complete these objectives. Asset management means managing infrastructure capital assets to minimize the total cost of owning and operating them, while delivering the desired level of service. Enclosed is additional information pertaining to asset management.

3. The city has approximately 230 hydrants and these hydrants are maintained in a good state of operation. A hydrant log book is available to track hydrant operation and maintenance; however, a hydrant numbering system or database is not in place to identify hydrants. We encourage the city to establish a database for tracking distribution system hydrants. Information including; hydrant location, make and model, critical components, dates of operation, flow test information (including static and residual pressure), and repair history should be maintained as part of the database record.

4. The city maintains approximately 300 isolation valves in the water distribution system and a card filing system is in place that identifies each valve. Some valves are turned during a service request or during repair of water main breaks; however, a formal valve turning program is not in place. Valve turning is important in keeping isolation valves in adequate working condition. Although it may not be feasible to turn every valve on a yearly basis, a program should be established where all valves are exercised at least once every three to five years.

5. The city's 1.0 million gallon elevated tank is scheduled for an internal inspection this fall. Please provide us with a copy of the tank inspection report for our review and comment.

6. The city maintains the services of Peerless Midwest, Inc. (Peerless), to conduct annual performance testing and servicing of each production well. Based upon the 2012 pump test, Peerless recommends pulling the pump and motor from Wells #2 and #5 for routine maintenance. Also, since these components were last pulled for maintenance in 2001 and 2000 respectively, they should be scheduled for routine maintenance. The Department of Environmental Quality recommends that all active well pumps and motors be pulled for routine maintenance once every five to ten years.

7. The city is currently conducting a meter change-out program for all residential meters. Also, several commercial meters are being replaced and meters are being added to several un-metered city owned facilities. We encourage the city to complete the meter change out program as it will reduce the amount of unbilled water. More accurate meters will also allow the city to determine the percent of unaccounted water (water loss).

8. The water department's 2010 bacteriological sampling site plan needs to be updated. The updated plan needs to include raw water sample locations as part of the repeat sampling protocol under the Groundwater Rule. Also, new distribution system repeat sampling locations are needed. Finally, Davison's water system contacts need to be updated. A sampling site plan template was provided to your operators and the template can be used in preparing the updated plan. Please send us a copy of the updated sampling site plan.

Should you require further information, please contact me at the telephone number below; via e-mail at prysbym@michigan.gov; or Department of Environmental Quality, P.O. Box 30242, Lansing, Michigan 48909.

Sincerely,

Michael Prysby

Michael F. Prysby, P.E., District Engineer
Resource Management Division
Lansing District Office
(517) 335-6122

mfp:jlr
Enclosures

cc: Mr. Michael Hart, City Manager, City of Davison
Mr. Brian Gist, City of Davison

CITY OF DAVISON
2012 WATER SYSTEM REVIEW

WSSN 1720 Supply City of Davison County Genesee

Date 8/1/2012 Reviewed by MFP District 11

Primary Contact:	Ed Brown	Copy To:	Michael Hart
Title	DPW Supervisor	Title	City Manager
Telephone	(810) 658-7491	Telephone	(810) 653-2191
Cell Phone	(810) 577-3558		
email	ebrown@cityofdavison.org		
Address:	200 E. Flint St. Suite 2	Address:	Same
	Davison, Michigan 48423		

WTP Phone #: (810) 658-7491

Population 5173 Year 2010 Basis City Est.

Distribution Classification: S-2

Operator in Charge Ed Brown Cert. S-2

Other Operators

Brian Gist	S-2
Tim Lear	S-3

Treatment Capacity 1.9 MGD

Treatment Classification: D-2

Operator in Charge Brian Gist Cert. D-2

Ed Brown	D-4
Tim Lear	D-3

The city of Davison is a groundwater supply with a water treatment plant. The treatment plant utilizes greensand filtration for iron and arsenic removal. Nanofiltration is utilized for softening and additional arsenic removal. Davison utilizes four wells for service and one well (non-treated) for back-up. Elevated storage and an extensive distribution piping network are also provided.

WELL INFORMATION

Well Number	2	3	4	5	6
Well Status	operating	operating	St-By	operating	operating
P.O.E. ID #					
Treatment	at WTP	at WTP	CL/PO_4	at WTP	at WTP
Year Installed					2003
Grouted?	Yes	Yes	Yes	Yes	Yes
Rock or Drift	Rock	Rock	Rock	Rock	Rock
Total Depth (ft.)	210'	260'	284'	283'	260'
Casing Depth (ft.)	109'	149'	218'	117'	116"
Casing Diameter (in.)	12"	12"	10"	16"	16"
Gravel Pack Dimensions					
Gravel Pack Material					
Screen Length (ft.)					
Screen Diameter (in.)					
Screen Slot Size					
Pump Setting					
Static Water Level (ft.)					16.6'
Pumping Water Level (24hr)					88'
Pumping Water Level (100 day)					
Pump Type	V.T.	V.T.	V.T.	V.T.	SUB
Permit Capacity					
Permit TDH					250 FT
Current Capacity	300 GPM	550 GPM	400 GPM	450 GPM	700 GPM
Basis	Peerless test	Peerless test	Peerless test	Peerless test	Peerless test
Current TDH	240 ft	208 ft	329 ft	215 ft	226 ft
HP	30	50	40	40	60
Last Pulled for Inspection	2001	2004	2009	2000	2004
Last Efficiency Test	2012	2012	2012	2012	2012
Well Seal	Yes	Yes	Yes	Yes	Yes
Casing 12" Above Grade	Yes	Yes	Yes	Yes	Yes
Pump to Waste Piping	Yes	Yes	Yes	Yes	Via Hydrant
-Screened or Capped?					Capped
Air/Vac Relief	Yes	Yes	Yes	Yes	NA
-Screened?	No	No	Vents outside		NA
Casing Vent	Yes	Yes	Yes	Yes	Yes
-Screened?	Yes	Yes	Yes	Yes	Yes
Check Valve	Yes	Yes	Yes	Yes	Yes
Meter	Mag	Mag	Mag	Mag	Mag meter
Raw Tap	Yes	Yes	Yes	Yes	In Valve Vault
Chem Tap	Yes	Yes	Yes	Yes	No
Plant Tap	At WTP	At WTP	At WTP	At WTP	At WTP
Chem Feed Outlet	Yes	Yes	Yes	Yes	No
Heater	Gas	Ele.	Ele.	Gas	NA
Water Level Device	Yes	Yes	Yes	Yes	NA
Pressure gauge	Yes	Yes	Yes	Yes	NA
Floor Drain	Yes	Yes	Yes	Yes	NA
Doors open out	Yes	Yes	Yes	Yes	NA
Comments:					

WELL INFORMATION

AUXILIARY POWER

Unit Number of Brand	75 KW Katolite (portable)
Fuel Type	Diesel
HP	
Starting Frequency	Monthly
Load Testing Frequency	Yearly

Comments:
A 600 KW stand-by power engine is capable of providing adequate stand-by power for the entire WTP and Well #5. A portable generator is also available for either Well #2 or Well #3. The 600 KW generator runs every Monday under no load.

ISOLATION

Well Number	2	3	4	5 & 6
Approved Isolation Radius	100'	100'	100'	100'
Available Isolation Radius	>100'	>100'	>100'	>100'
Type of Isolation Control	Municipal Ownership of all five wells.			
Approved WHP Plan	yes	yes	yes	yes
GW flows from				
Basis				
Important Potential Source				
Distance and Direction				
Important major Source				
Distance and Direction				
Detects				

Comments:
Well #6 is piped directly to the WTP and does not have a wellhouse. A meter vault is located adjacent to the well and contains the pressure transducer, mag meter, sample tap, valving, etc. Routine pump and motor maintenance was completed on Stand-by Well #4 in 2009. The work also included replacement of the pump column and shaft. All production wells are pump tested on a yearly basis by Peerless Midwest, Inc.

Well #2 and #5 are due for routine pump/motor maintenance. Well #2 is scheduled for pump/motor maintenance later this summer. An existing observation well remains un-plugged at the vicinity of Well #6.

All five wells are designated as "moderately vulnerable" to volatile organic compounds, pesticides, and herbicides. This determination and the associated chemical monitoring schedules are discussed in previous correspondence.

PRODUCTION AND STORAGE REQUIREMENTS

Year	Max Day - Date	Avg. Day	Avg. Day - Max Mo	Max/Avg	G/C/D	% unacct.H2O
2002	1.22 MGD	0.61 MGD	0.89 MGD	2	110	
2003	1.68 MGD	0.57 MGD		2.95	103	
2004	1.36 MGD	0.53 MGD		2.57	96	
2005	1.41 MGD	0.62 MGD		2.27	112	
2006	1.60 MGD	0.58 MGD		2.76	105	
2007	1.03 MGD	0.68 MGD		1.51	123	
2008	0.70 MGD	0.47 MGD		1.49	92	
2009		0.48 MGD				
2010	0.96 MGD	0.55 MGD		1.75	106	
2011	0.97 MGD	0.54 MGD		1.8	104	

Five Year Max. Day	1.03 MGD
Ten year Max. Day	1.68 MGD
Five Year Avg. Day	0.55 MGD

Max Day for capacity requirements 1.03 MGD

Comments:
The water rate schedule was updated and the new schedule changes the methodology of minimum billing which will allow the water department to determine the percent of unaccounted water loss. Updates to the metering system are also underway. Many meters were discovered to be inaccurate or not functioning. Percent unaccounted water will be able to be determined as meter replacement is completed.

The water rate study will be updated in 2013 by Black & Veetch. The rate study will also include a 6-year capital improvements program.

WELL CAPACITY

Total Well Capacity 2000 gpm 2.88 mgd

Firm Well Capacity 1300 gpm 1.87 mgd

Max. Day/Firm Well Capacity 55 %

Total Auxiliary Power Well Capacity 1000 gpm 1.44 mgd

Aux. Power Well Capacity/Avg. Day 262 %

PRODUCTION AND STORAGE REQUIREMENTS

STORAGE CAPACITY

	Location: Clark St. @Well #5
Volume	1.0 M Gal
Type	Multi-Leg Ped.
O.F. Elevation	
Date Constructed	1971
Date Inspected	2008
Date Painted Inside	2007
Paint System	3 coat epoxy
Date painted Outside	2007
Cathodic Protection	Yes
High Alarm	Yes
Low Alarm	Yes
Type	SCADA

Total Usable Storage	1,000,000	gal	1	mgd
Total Usable Storage/Max Day	97	%		
Total Usable Storage/Avg. Day	185	%		

Comments:

The elevated is scheduled for an internal "wet inspection" during the fall of 2012. Dixon will conduct the tank inspection.

Interconnections with Other Supplies

Is water purchased from other supplies? No

Distribution Piping

Identify distribution piping materials - estimate percentages:

Cast Iron	33	%
Ductile Iron	33	%
PVC	0.01	%
A/C	32.90%	

Estimated percent of piping with coal tar lining None %

Identify distribution pipe sizes - estimate percentages:

2"	0	%
4"	5	%
6"	35	%
8"	20	%
10"	0	%
12"	40	%

Are there areas where water main breaks are frequent? See below

Comments: Main Street has experienced more frequent breaks. The city intends to replace this section of main from Clark Street to Mill Street in 2013 if adequate funding is available. Other problem areas such as Flint Street are attributed leaking joints.

Are there areas where customers complain of low pressure? No

Are there areas where aesthetic water quality complaints are frequent? No

Are there areas where fire flows cannot be maintained? See below...

Last ISO report: 2008 Rating? Class 4

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading, or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

Location: Estimated Completion Date

The city's 1998 Water System Reliability Study has not been updated as we requested. The updated study will need to re-assess the city's distribution system. A September 30, 2013 deadline to complete the Reliability Study will be established.

Comments:

A few 4-inch mains exist in the older portions of the city along with a few isolated dead-end mains. A 12-inch transmission ring around the city provides adequate capacity for fire protection for most areas of the city.

DISTRIBUTION APPURTENANCES

HYDRANTS

Number of Hydrants	230
Number Without Auxiliary Shut-Off Valves	0%
Number that are Self-Draining	25%
Number of Inoperable Hydrants	repaired upon discovery
Frequency of Hydrant inspection:	Spring/Fall

Inspection Staff: DPW
Comments:

In addition to the number of hydrants listed above, there are also 7 raw water hydrants and 4 below grade hydrants. Dead-end mains are flushed on an as-needed basis.

Are there areas where additional hydrants are needed?	No		
Hydrant location system	General Plan	Accurate?	ok
Are hydrants color coded for capacity?	Yes		
Has this information been provided to the fire department?	Yes		
Frequency and seasons of hydrant flushing	dead-ends flushed as needed		
Purpose of flushing	Aesthetics		
Is the public notified prior to flushing?	Yes		
Does flushing follow a specific format?	NO		
Is the volume of water used during flushing estimated?	Yes, on MORs		
Is a record maintained of hydrant activities?	Yes		

Comments:
A hydrant log is being compiled to track the condition of system hydrants. A numbering system or database is not place to identify hydrants.

VALVES

Number of Valves	275 - 300		
Number of inoperable valves	repaired upon discovery		
Are there areas where additional valves are needed?	To be det. in reliability study		
Valve location system	Card file - 100% comp	Accurate?	Yes
Valve Turning Frequencies	1/yr primary, 1/yr others		
Records Maintained?	Yes		

Valve turning frequencies: A card filing system is in place for all valves. A formal valve turning program is not in in place. Valves are turned during a service request or during repair of a main break.

CUSTOMER AND SERVICE INFORMATION

Number of service connections	1743
Number of metered service connections	1743

Identify service line materials and estimate percentages:

Cu	app. 100%
Gal	very few
PVC	very few
Pb	very few

PUMPAGE DISTRIBUTION

% Residential	>75%
% Commercial	<25%
% Industrial	very few
% Large Users - List	Schools
	Continental MHP *

* The master meter at the MHP is not functioning properly. The master meter pit will be updated and will include provisions for backflow protection.

Ownership of Service	(CWS/Customer)
From Corp Stop to Curb Stop	City
From Curb Stop to Property Line	Prop owner
From Property Line to Meter	Prop owner
Meter	City

Customer Meters

Types of meters Used	Pos. displacement,turbine,compound
Number of Meters with Touch Pads or Other Remote Reading Devices	90%
Size of Meters	5/8" to 6"
Residential	5/8" to 3/4"
Industrial/Commercial	1" to 6"
Meter Testing/Maintenance Program	no
Average Age of Meter is System	20 yrs
Residential/Commercial/Industrial	> 10 yrs
Criteria for Changeout	new owner/non remote/not radio capable
Number or Percent Changeout per Year	70 to 75
Master Meter Locations	Continental MHP
Calibration of Master Meters	NA
Meter Reading Staff/Contract:	City DPW

The city is proceeding with a meter change-out program. Existing residential meters will be replaced with venturi meters. Approximately 60-70 residential meters were replaced over the past 6 months. Several 2-inch commercial meters have been replaced and the meters are being added to existing city-owned facilities - parks, etc. The objective is to reduce the average age of the residential meters and to implement a testing program within 3 to 5 years. Larger meters (>2 -in) will be tested by an outside contractor.

System Growth

Year	No. of Residential Meters Installed	No. of Comm./Industrial Meters Installed	No. of Construction Permits Issued	Permitted Amount of WM Feet
2000			None	
2001			None	
2002			1	1063
2003			1	WTP
2004			1	1821
2005			2	9626
2006			1	1377
2007			0	0
2008			1	370
2009			0	0
2010			0	0
2011			0	0
2012			1	2110 wm repl

Water Rates

What is your current rate schedule?	$20.45 base + $2.53/1000 gal
Are current rates adequate to support O&M and CIPS?	CIP - marginal, O&M - yes
When was last time rates were adjusted?	Dec. 2010
Has a water rate study been performed? When?	update needed
Is there a meter charge or ready to serve charge?	yes
Is a copy of the water rate schedule and ordinance available?	See WSR attachment

Comments: The city changed their water rate structure late in 2010 (see schedule). A new rate study will be performed in 2013 along with a new rate schedule.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	yes
Repair Clamps (2 or more for each size)	yes
Tees, Crosses & Elbows	no
Hydrants	no
Valves	no
Services (Corp & Curb Stops, Clamps and Lines)	yes
Other	

All parts not stocked at the DPW are readily available through Mich. Pipe & Valve

Safety Issues

Confined Space Entry Program in Place % Followed (Y/N) - Basic program in place.	yes
Trench Safety Program in Place & Followed (Y/N) Informal program in place	yes

Comments:

Additional growth information (meter installation counts) will be obtained in subsequent site visits.

PROGRAMS AND PLANS

CROSS CONNECTION PROGRAM

Ordinance No. Ord. revised - copy to be provided

Approved Program? Yes Date: 1/24/1979

Staff Assigned to Program DPW

Is Annual Cross Connection report required? Yes

Was previous year's annual report received? Yes Date 3/26/2012

Was previous year's annual report acceptable? see comments

Inspection Status: Active Program

Device Testing Frequency RPZs are inspected and tested 1/Yr

Recordkeeping Adequate

Comments:
The city updated their cross connection control program and identified additional accounts eligible for routine inspections. The number of high and low hazard accounts noted in the 2011 CCCP report does not reflect the total number of accounts (Item C). The 2011 report will be corrected and a copy will be provided to us. The city's cross connection ordinance was recently updated and a copy of the updated ordinance needs to be provided to us.

ANNUAL PUMPAGE REPORTS

Is Annual Pumpage Report required? no

Was previous year's annual report received? no Date na

MONTHLY OPERATION REPORTS

Are Monthly Operation Reports required? Yes

Were all previous year's reports received? Yes Timely? Yes

Are previous year's reports acceptable? Yes

CONSUMER CONFIDENCE REPORTS

Is the annual CCR requires? (Y/N) Yes

Was the previous year's report received? (Y/N) Yes Timely? Yes

Was the previous year's acceptable? (Y/N) Yes

Was the previous year's certification form received? (Y/N) Yes Timely? Yes

PROGRAMS AND PLANS

Emergency Response Plan

Date of Most Recent Plan 3/8/2011 Acceptable? Yes

Filed where? MDEQ & City

GENERAL PLAN

Date of Most Recent Plan 2004 Acceptable? needs updating

Filed Where? MDEQ/DPW/City Hall

Comments:
The 2004 general plans needs to be updated

RELIABILITY STUDY

Date of Most Recent Study 1998

Filed Where? MDEQ, City Acceptable? needs updating

Comments:
The city has not proceeded with updating their 1998 water system reliability study.

BACTERIOLOGICAL SAMPLING SITE PLAN

Date of Approved Plan Feb-10

Are samples still being collected in accordance with the plan? Needs to be updated

Comments:
The 2010 sampling site plan needs to be updated. The updated plan needs to specify the raw water sampling locations as part of the Groundwater Rule. Also, new upstream and downstream repeat sampling locations are needed. System contacts also need to be updated.

LEAD/COPPER MONITORING PROGRAM

The city continues to conduct triennial monitoring and meet both action levels. The next round of samples are due by 9/30/2014.

WATER TREATMENT PLANT - (softening, arsenic & iron removal)

IRON & ARSENIC REMOVAL Step:

Year Initiated	2004
Point of Entry ID #	
Oxidation Method	CL2, KMnO4
Rated Capacity	1.9 MGD @ 3.0 gpm/ft^2
Backwash Rate	15.0 gpm/sqft gpm/ft^2
Total Rated Capacity	1.9 MGD
Detention Tank	None gal
Filter Type	2- Horizontal Pressure filters (10ft X 22ft each)
Filter Specifications:	
Number of Cells	2 cells per filter, 4 total
Media Depth--	
Greensand	18 inches
Anthracite	12 inches
Gravel	16 inches
Uniformity Coefficient	<1.6
Effective Size	0.3 - 0.35mm - greensand 0.6 - 0.8mm - anthracite
Oxidation Chemical Feed Specifications/Equipment:	
Compound	Sodium Hypochlorite
Concentration	12%
ANSI/NSF Standard 60	Yes
Locations of Injection Pt.	Pressure filter influent and prior to POE
Feed Rate	0.2 to 0.4 ppm - filter influent 1.3 to 1.5 ppm - prior to POE
Number of Positive Displacement Feed Pumps	One plus one spare
Rated at:	20 gpd @ 90psi
Storage Tank(s)	1 bulk storage tank & 2 day tanks
Capacity	1000gal & 15 gal

Comments: Potassium permanganate is also added for oxidation. See Page 18 for additional chemical feed details. Security provisions include WTP fencing, cameras, and entrance alarms.

FILTER BACKWASH REQUIREMENTS:

Filter run times averages approximately 10 days. Backwashes are operator initiated and the criteria for backwash is pressure differential. Filter backwash is conducted for 28 minutes and consists of the following:

Low rate with air:	10min
Low rate:	5min
High rate:	8min
Filter to waste:	5min

The backwash water is sent to a backwash detention tank immediately below the backwash discharge pipe. The backwash detention tank is sized to hold one backwash volume. The tank drains by gravity to the sanitary sewer.

Backwash Storage

Disposal Dissipation Tank:	Volume:	6,100 gallons	9'-3" X 14'-8"X 6' deep
Vent/Overflow:		yes	
Disposal Method:		San. Sewer	

Iron removal backwash water is discharged to the Genesee Co. sanitary sewer under an approved Industrial Pretreatment Program permit.

The backwash discharge line extends below the sump floor elevation and poses a cross connection. The backwash discharge tank; however, has an overflow that is several inches below the discharge line. Also, a visual observation of the closest three sewer manhole rim elevations confirm that the detention tank is not susceptible to a sanitary sewer surcharge.

SOFTENING: (Nanofiltration)

Type of Units: Osmonics Model: _____

Date Installed: Jun-04 _____

The nanofiltration units consist of 2 treatment skids with 12 membrane tubes in each skid. Each skid has a treatment capacity of 360 gpm (influent) and produces 270 gpm of permeate. Each skid also produces 90-95 gpm of concentrate. Each skid treats the water in two stages. The first stage involves treatment through the first set of membranes (8 tubes). The concentrate from the first set of membranes is treated through the second set of membranes (4 tubes). The two-stage treatment results in a treatment efficiency of approximately 78%

No. of CMF Units/Arrays: 2 No. of Modules/CMF Unit: 12
Extra Modules Onhand (Y/N): No
No. of Extra Modules: None

Method of Providing PLC Redundancy: Each unit has back-up PLC.

Maximum Approved Transmembrane Pressure: 50 PSI
Maximum Operating Transmembrane Pressure: 48 PSI

Maximum Approved Filtration Flux Rate (w/units): _____ gpm/m^2 16 $gals/ft^2/day$
Maximum Operating Filtration Flux Rate (w/units): _____ gpm/m^2 _____ $gals/ft^2/day$

Membrane Feed Pumps: Number: 2 Type: HC
Capacity: 375 gpm TDH: 39ft
Capacity: Total: 540 gpm Firm: 270 gpm
Treatment Rate/Module: 360 gpm

No. of Prefiltration Strainers: 3
Type of Strainers: Cartridge Filters Self/Manual Cleaning: Disposable
Size of Units: 6 inch Mesh Size: 1 Micron
Cross Connection Protection of Auto Cleaning Systems (Y/N): Yes

The cartridge filters are changed when filter stain diameter reaches 1/8 of an inch. The stain impregnates into the filters this distance after 12-14 weeks of operation. If the pressure loss exceeds 6 psi, the filters are replaced.

Dechlorination System
Chemical Used: Sodium Bisulfate ANSI/NSF Std 60 App? Yes
Chemical Supplier: Alexander Chemical
Feed Pumps Used:
No. of Pumps: 1 Capacity: 3 GPD: 300 @ PSI

Dosage: 2.6-2.8 mg/l Overflow: _____
Dosage Determination Sodium Bisulfate fed from 55 gallon drum on top of weigh scale

Laboratory/Analytical Equipment

Chlorine, Iron, Manganese: Hach DR 2700 - also has the older DR 2400 unit available
Arsenic: ITS Quick portable test kit
Hardness: Hach 16900 Digital Titrator

Air Compressors: Number: 1 HP: 5
SCFM: _____ PSI: 182

One air compressor with a dual head is provided to operate the pneumatic controlled valves.
The compressor is maintained on a yearly basis.

Clean in Place (CIP) System:

Chemical(s) Used: Avista Tech Ro Clean P-11 (high pH) & P-303 (low pH)
Recirculating Pump(s): No.: 1 TDH: 64 feet Goulds Pump
GPM: 250 HP: 15
Volume of Solution Tank: 7 ft dia. X 7 ft 1000 gallons
Cross Connection Protection Between Arrays/Units for CIP Piping (Y/N): No, just check valves
Hours of Operation Between Chemical Cleanings: RO 1 cleaned Sept 2011, RO 2 cleaned Feb. 2012
Full Restoration of TMP? (Y/N): Yes If No, Describe: NA

The CIP system uses RO Clean P-11 and P-303 a high and low pH solution supplied by Avista Tech.
The membranes are cleaned approximately once a year

Caustic is added to the spent CIP solution for neutralization prior to discharge to the sanitary sewer.

Residuals Handling:

RO concentrate waste water is discharge to a local receiving stream and has an NPDES permit authorizing the discharge.

NPDES: MI0057427 - renewed November 1, 2010

Renewed permit expires 10/1/14

HIGH SERVICE PUMPING

Pump Number	1	2		
Year Installed	2004	2004		
Type	VT	VT		
Permit Capacity	540gpm	540gpm		
Permit TDH	138ft	138ft		
Current Capacity	*	*		
Basis	*	*		
Current TDH				
HP	30	30		
Last Complete Inspection	2009	2009		
Last Efficiency Test	2012	2012		

Comments:

The high service pumps are paced to match permeate flow from the membrane skids. The high service pumps are VFD controlled and can operate in a range from between 270 gpm to 540 gpm. The high service pumps take suction from one 2000 gallon clearwell. The pump packings and bearings are maintained on a yearly basis. Peerless-Midwest also performs yearly maintenance on the pumps. The WTP can be by-passed through piping that by-passes the greensand filters, RO treatment units, and the clearwell. The clearwell level transducer was recently replaced.

AUXILIARY POWER

Unit Number or Brand	Katolight
Power Type	Engine
Fuel Type	Diesel
HP/KW	600 KW
Capacity	WTP/Well #5
Starting Frequency	Weekly
Load Testing Frequency	Yearly

Comments: A diesel powered engine is located behind the WTP and is operated weekly for 30 minutes under no load. A doublewalled fuel tank serves as the base for the engine/generator set.

Total H.S. Pump Capacity	1,080	gpm	1.56	mgd
Firm H.S. Pump Capacity	540	gpm	0.78	mgd
H.S. Auxiliary Power Capacity	1,080	gpm	1.56	mgd
Firm H.S. Pump Capacity/Max Day	75.7	%		
Aux. Power H.S. Pump Capacity/Avg Day	283	%		

PLANT OPERATION:

Hours Per Day Operator Attendance: 5 days per week (4 hours/day)
Sat & Sun - 2 hrs/day

CHEMICAL FEED

CHLORINE

Chemical supplied: Liquid sodium hypochlorite - 12.5%

UL/NSF approved? Yes

Dosage: CL2 dosage (raw water) is approximately 0.2 - 0.4 mg/l
CL2 dosage (clearwell) is approximately 1.3 - 1.5 mg/l

Supplier: Elhorn Engineering

Chlorine Feed Points:
1) Raw water line prior to greensand filter
2) Finished water - clearwell

Type of Feeders: Two Pulsatron metering pumps each rated at 20 gal/day at 90 psi.
A spare feed pump is also available

Chlorine Room Description: The chlorine feed room is located in the NW corner of the WTP adjacent to the other chemical feed rooms. The room is shared with the potassium permanganate feed feed system. A 2 foot containment wall isolates the chlorine feed area from the remainder of the WTP and the permanganate feed system.

CL2 Application Measurement: Each day tank is placed on top of a digital read weigh scale. The chlorine dosage is determined by the pounds of chlorine solution used each day.

Bulk Storage: One 1250 gallon bulk storage tank followed by two 15 gallon day tanks. Two transfer pumps are provided to transfer liquid chlorine to each day tank.

Chlorine Safety Features/Summary:

The chlorine room is self-contained since a 2-foot wall separates the chlorine storage tanks and feed equipment from the rest of the WTP.

NSF Approved - Yes
Leak Detection Bottle - NA

An adquate supply of chemical, feed pumps, and spare parts are maintained.

FLUORIDE

Chemical supplied: Hydrofluosilicic acid

UL/NSF approved? Yes - Elhorn

Dosage: 0.7 - 0.8 mg/l

Chemical feed point: After clearwell in high service discharge line

Supplier: Elhorn

Chemical feeders:

	model	max feed rate
1	Pulsatron	rated at 3 gal/day @ 300 psi

one spare pump is available

Chemical feed dosage determination: The storage tank is placed on top of a digital read scale. The dosage is determined by the pounds of acid applied on a daily basis.

Scales: Digital read scale provided

Chemical Storage: One 15-gallon tank is located on top of the weigh scale. One additional tank is stored. No bulk storage is provided. Acid is fed directly from the supplier's 15 gallon tank.

Spill protection: The fluoride feed room floor is recessed 6-inches below the WTP's main floor and provides sufficient containment.

Piping identification: Color coding is provided on the pump discharge piping in the chemical feed room and throughout the WTP.

Overfeed protection: A flow switch is provided on the incoming raw water line and on the filter applied line. The flow switches are both controlled by the WTP's SCADA system and must both detect flow in order for the fluoride feed pump to be activated. The SCADA system also has a set-point that limits the maximum volume of acid that can be applied on a daily basis. If the maximum volume is achieved, the control system shuts the fluoride feed pump down.

Other Chemical Additions

PHOSPHATE:

Chemical supplied: Carus 8600 (corrosion control)

UL/NSF approved? Yes - Carus

Dosage: 2.0 - 2.1 mg/l

Chemical feed point: After clearwell.

Supplier: Elhorn Engineering

Chemical feeders:

	model	max feed rate
1	Pulsatron	58 gal/day @ 250 psi

Chemical feed dosage determination: Dosage is determined by the pounds of phosphate applied on a daily basis. A digital read scale is provided to measure the amount of phosphate applied.

Scales: Digital read weigh scale

Chemical Storage: PO4 is stored in 30 gallon drums shipped directly from Elhorn. The drum is set on the weigh scale and PO4 is fed directly from the drum. A second 30 gallon drum is stored in the chemical feed room.

POTASSIUM PERMANGANATE: (equip located in CL2 feed room)

Chemical supplied: KMnO4

UL/NSF approved? Yes - Curcus Chemical Co.

Dosage: 0.3 mg/l average application

Chemical feed point: prior to greensand filters

Supplier: Elhorn

Chemical feeders: Two metering pumps are provided.

	model	max feed rate
2	Pulsatron	44 gal/day @ 150 psi

Chemical feed dosage determination: Dosage is determined by measuring the change in the level of the KMNO4 solution with a sonic sensor.

Scales? No weigh scale - a Hydro-Meter 200 sonic sensor is provided to measure the change in liquid level in the solution tank (sonic meter not used). Tank is graduated with 48-inch ruler.

Chemical Storage: One 150 gallon tank is provided for the KMNO4 solution. Several 7.5 gallon buckets of dry KMNO4 are stored in the chem feed room. A 3% KMNO4 solution is made up in the feed tank.

SODIUM BISULFATE:

Chemical supplied: 40% Sodium Bisulfate

UL/NSF approved? Yes

Dosage: 2.9 - 3.0 mg/l

Chemical feed point: Influent to each membrane

Supplier: Alexander Chemical

Chemical feeders: Two metering pump with spare

	model	max feed rate
2	Pulsatron	3 gal/day @ 300 psi

Dosage Determination: Dosage is determined by the amount (pounds) of sodium bisulfate that is applied.

Scales? Digital read weigh scale

Chemical Storage: Two 55-gallon drums of bisulfate are stored in the chemical feed room. One drum is located on the weigh scale and bisulfate is fed directly from the drum.

ANTI SCALANT:

Chemical supplied: Hypersherse MD 150

UL/NSF approved? Yes

Dosage: Up to 5.0 mg/l

Chemical feed point: Influent to each membrane

Supplier: GE Betz

Chemical feeders: Two metering pumps with spare

	model	max feed rate
2	Pulsatron	6 gal/day @150 psi

Dosage Determination: Dosage is determined the amount (pounds) of anti-scalant that is applied.

Chemical Storage: Two 55-gallon drums of anti-scalant are stored in the chem feed room. One drum is located on the weigh scale and anti-scalant is fed directly from the drum.

Scales: Digital read weigh scale

FERRIC CHLORIDE: Not in use.

Chemical supplied: Ferric chloride

UL/NSF approved?

Dosage: NA

Chemical feed point: Influent to greensand filters - not in use

Supplier:

Chemical feeders: Two metering pumps with spare

	model	max feed rate

Dosage Determination: The ferric feed system is not in use.

Chemical Storage: One 55-gallon drum of ferric chloride is stored in the chemical feed room.

Scales: Digital read weigh scale

ADDITIONAL CHEMICAL FEED ROOM COMMENTS:

The chemical feed area for the WTP is comprised of three separate rooms. The following chemical applications are paired together in each of the three rooms:

Chlorination & Potassium Permanganate

Fluoridation, Ferric feed, & Anti-Scalant

Phosphate & Sodium Bisulfate

Evaluation of Community Water Supply - Water System Review Summary				
Name of Supply: City of Davison		WSSN:	1720	
County: Genesee		District:	11	
Evaluator: MFP		Date:	8/1/2012	
Overall Rating Satisfactory: X Marginal: Deficient:				
	N/A	Sat.	Marg.	Def.
General				
Operator Certification		X		
Ownership		X		
Source				
Well Construction & Maintenance		X		
Standby Power		X		
Isolation		X		
Capacity		X		
Storage				
Construction		X		
Controls		X		
Maintenance		X		
Capacity		X		
Distribution				
Interconnections with other Supplies	X			
Pump Stations	X			
Operational Concerns & Maintenance		X		
Hydrants		X		
Valves		X		
Customer Service Information		X		
Program Compliance				
Cross Connections		X		
Annual Pumpage Reports/MORs		X		
CCR		X		
Emergency Resp Plan		X		
General Plan - needs to be updated			X	
Reliability Study - Study not updated as requested				X
Permits		X		
Capacity Development				
Monitoring				
Bacteriological - sampling plan needs updating			X	
Chemical		X		
Lead/Copper		X		
Radiological		X		
Treatment				
Disinfection		X		
Phosphate Addition	X			
Fluoride		X		
Iron/Arsenic/Manganese Removal		X		

2270

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

September 3, 2015

Mr. Dan Czarnecki, Public Works Director
City of Fenton
301 South Leroy Street
Fenton, Michigan 48430

WSSN: 2270

Dear Mr. Czarnecki:

SUBJECT: 2015 Sanitary Survey; City of Fenton Water System

This letter confirms my visits with Mr. Steve Guy, water plant superintendent, on April 27, 2015, and May 28, 2015, and with you on May 20, 2015.

Below is a summary of the subsequent review and discussion of the water supply facilities serving the City of Fenton (Fenton) water system. The purpose of the meetings was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399) and the Administrative Rules adopted from Act 399. In addition, the enclosed Water System Sanitary Survey was updated to gather information on the Fenton water system.

Our updated survey visit confirms that Fenton completed rehabilitation of Well #5. The work included overhauling the pump and motor, chemical cleaning of the well screen, and replacement of the drop pipe. A variable frequency drive controller was also installed. Based upon the pump installation report, Well #5's original capacity has been restored. This work demonstrates Fenton's commitment towards maintaining investment in its groundwater source. We encourage Fenton to maintain a proactive well maintenance program on all four production wells. The wells due for routine maintenance in the next one to two years include Wells #7 and #8.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	Recommendations made
Treatment	Recommendations made
Distribution System	Recommendations made
Finished Water Storage	Recommendations made
Pumps (All dist. Pumping)	Recommendations made
Monitoring & Reporting	Recommendations made
Management & Operations	**Deficiency Identified**
Operator Compliance	No Deficiencies/Recommendations
Security	No Deficiencies/Recommendations

Financial	Recommendation made
Other	Not applicable

The following deficiency is a violation of Act 399 and must be resolved in order to return the water system to compliance.

R 325.11203 of the Administrative Rules of Act 399 requires Type-I public water supplies to conduct a water system Reliability Study (RS) and update the RS every five years. The city has been requested to update their most recent RS (2005 Drinking Water Revolving Loan Project Plan) on several occasions and it is our understanding that an updated RS is being prepared and a draft copy will be provided to us for review and comment. Fenton will re-achieve compliance with R 325.11203 following our review and approval of the updated RS.

Next, it is hoped that the following recommendations will prove useful in enhancing the operation and maintenance of your water supply.

1. Update Fenton's most recent (2008) water system General Plan (GP) by January 1, 2016. The updated GP needs to include the following information in accordance to the revisions in the Act 399 rules.

    - General layout of the entire waterworks system, including distribution system piping and the location of valves, hydrants, storage tanks, and master meter connections.

    - A hydraulic analysis of the distribution system showing pressure contours under peak demands and inventory of watermain by size, material, and age. The hydraulic model used in the updated RS can be used for the GP. The hydraulic model needs to reflect the water distribution system's current configuration and include the most recent improvements.

    - Service area map including existing and future service area boundaries.

    - Water System Capital Improvement Program (WSCIP) for the 5-year and 20-year planning periods. The WSCIP should be based upon recommended improvements that are presented in the updated RS.

2. Since both the RS and the GP need to be completed within the next six months and they contain overlapping elements, it may be worthwhile to update them concurrently.

3. Re-implement Fenton's Wellhead Protection Program (WHPP). Fenton's WHPP approval status expired on January 2, 2015. Given the resources and effort put forth to establish the program, we encourage Fenton to re-establish the program and maintain all WHPP activities. For further information and/or assistance in re-implementing the WHPP, please contact Mr. Jason Berndt from our Community Drinking Water Unit at 989-705-3420.

4. Install meters in the remaining un-metered governmental buildings in the downtown area. A fully metered system will help to further refine future un-accounted water use (loss) determination.

   We also recommend that Fenton upgrade their metering system to a radio-read system. A full radio read system is a significant water system improvement, as it significantly reduces the time needed to conduct routine meter reads and allows water utility operators to focus on other O&M programs. Radio read also enhances leak detection and improves customer service by providing the water utility the ability to inform customers of leaks and other abnormal conditions.

5. Operate the stand-by power generators under load for each production well on a yearly basis to confirm proper operation of all the electrical components. This practice also helps water utility operators remain familiar with the procedures in switching to and from stand-by power generation.

6. Pursue full electrical surge protection for the main pumping components at the water treatment plant (WTP). This provision will increase the operating reliability of the WTP, help avoid costly repair to the electrical components, and minimize disruption of routine WTP operation.

7. Repair or replace the aeration unit's air-intake screens. These screens are essential in preventing insects and other foreign objects from entering the aerator unit. Routine inspection of the intake screens and repair/replacement on an "as-needed" basis is essential in maintaining the sanitary integrity of the aeration system.

8. Deterioration of the WTP's solids contact unit epoxy coating system was noted. Replacement of the epoxy coating system on each contact clarifier is recommended within the next one to two years. Fenton shall obtain an Act 399 construction permit for this work. The new epoxy coating system must be an approved product under ANSI/NSF Standard 61 suitable for contact with potable water.

9. Continue to work towards expanding the WTP filter maintenance program to include a broad scope of filter investigation techniques. This should include;

   - General filter inspections
   - Review of water quality and operational information
   - Filter media expansion measurements
   - Gravel mounding measurements
   - Free board to media measurements
   - Box excavations (media profile)

- Core sampling and media examination

WTP operators continue to gain operating experience and knowledge unique to this facility. Further filter preventative maintenance activities will continue to increase their familiarity with overall WTP maintenance. Finally, filter media cleaning (recommended by Utility Services) should also be completed. If Fenton proceeds with filter media cleaning, the procedure to clean the filters will need to be reviewed and approved by our office.

10. Inspect filter gullets and clearwell as individual treatment trains are taken out of service as part of routine operation. Any cracks that are discovered should be properly repaired to prevent cross connection. A more comprehensive inspection of the clearwell should be completed within the next one to two years.

11. Adjust the WTP's fluoride (FL) dosage to meet the recently revised optimal FL concentration in drinking water of 0.7 parts per million (ppm) as established by the United States Department of Health and Human Services. Dosages should be based on Fenton's raw water fluoride concentration.

12. Sodium Hexametaphosphate and Orthophosphate are added for filter aid and corrosion control treatment respectively; however, Page 5 of the monthly operation report (MOR) reports total phosphate (PO4) applied in pounds and milligrams per liter (mg/l). Each compound; however, shall be reported separately in the MOR. Also, the PO4 concentration in mg/l shall be monitored at the plant tap and distribution system and reported in the MOR. The minimum monitoring frequency for PO4 should be weekly at the plant tap and at distribution system locations in conjunction with total coliform monitoring.

13. Recoat the exterior portion of both ground storage tanks and repair the roof hatch hinge based on Utility Service's recommendations. Also, tank site visits should be conducted by water operators on a weekly basis to check tank appurtenance (vents and overflows) and security conditions.

14. Provide stand-by power and upgrade telemetry control at the Adelaide Road pump station to improve the level of water service for residents in the Jane Hill subdivision.

15. Establish a comprehensive valve operation and maintenance program. An active valve program helps to keep valves in good operating condition, reduces interruptions in service during emergency repairs, and reduces water loss and property damage. Given the number of isolation valves in the water distribution system, we recommend establishing a segmented approach (prioritize valve turning by quadrants). This methodology has worked well for other water utilities and allows most isolation valves to be operated over a four to five year period. Fenton is encouraged to implement this approach as a means to expand their valve program.

16. Update the 2010 Bacteriological Sampling Site Plan. The updated plan needs to reflect changes in system contacts (local and DEQ). A bacteriological sampling

site plan template was provided to the water utility and can be used for preparing an updated plan. A copy of the updated sampling site plan needs to be provided to the Department of Environmental Quality (DEQ) for review and approval.

Please submit a letter by September 30, 2015, that outlines Fenton's plans and schedule to address the above items.

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

Enclosures

cc: Mr. Stephen Guy, City of Fenton
Mr. Lynn Markland, City of Fenton

Office of Drinking Water and Municipal Assistance

Lansing District Office

Water System Sanitary Survey

City of Fenton

WSSN 02270

May-2015

CONSTITUTION HALL • 525 WEST ALLEGAN STREET • P.O. BOX 30242 • LANSING, MICHIGAN 48909-7742

www.michigan.gov/deq

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Fenton
County: Genesee
Evaluator: Michael Prysby

WSSN: 02270
District: Lansing
Date: 5/28/2015

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source					x		
Construction & Maintenance	*Perform pump/motor maint. Wells 7 & 8 (2016-2017)*				x		
Standby Power	*Establish annual load test for each production well*				x		
Isolation				x			
Source Water Protection	*Update Wellhead Protection Program*				x		
Capacity				x			
Treatment					x		
Disinfection							
Fluoride	*Adjust FL2 dosage to optimal concentration - 0.7 ppm*				x		
Phosphate Addition				x			
Softening	*Replace epoxy coating syst. for each solids contact unit*				x		
Iron/Manganese Removal		x					
Arsenic Removal		x					
Pretreatment		x					
Filtration (gravity or membranes)	*Expand filter maintenance prog.*				x		
C*T		x					
Other (Aeration)	*Repair or replace air intake screens*				x		
Distribution System					x		
Interconnections w/ Other WS		x					
Hydrants & Valves	*Expand valve O&M program*				x		
Service Lines & Metering	*Pursue full metering & upgrade to radio-read system*				x		
General Plan	*Update General Plan by Jan. 1, 2016*				x		
Cross Connections				x			
Construction & Maintenance				x			
Capacity				x			
Finished Water Storage	*Recoat GST exterior/ perform weekly visits*				x		
Construction & Maintenance	*Inspect WTP clearwell within next 1-2 years*				x		
Controls				x			
Capacity				x			
Pumps (All Pumping Facilities)	*Pursue lightning surge protection - WTP high service*				x		
Construction & Maintenance	*Add st-by power to Jane Hill Sub. P.S/ telemetry imp*				x		
Controls				x			
Capacity				x			
Monitoring & Reporting					x		
Bacteriological Monitoring	*Update most recent Bacti Sampling Plan*				x		
Chemical Monitoring	*Monitor PO4 conc at Ptap and dist*				x		
MOR or Annual Pumpage Report	*Report dosage of both PO4 compounds separately*				x		
Consumer Confidence Report				x			
Analytical Capabilities				x			
System Management & Operations						x	
Owner Responsibility				x			
Capacity Development				x			
Reliability Study	*Complete revision of RS and provide draft report to DEQ*					x	
Operations Oversight				x			
Permits				x			
Operator Compliance				x			
Operator Certification				x			
Technical Knowledge & Training				x			
Security				x			
Emergency Response Plan				x			
Site Security (Fences, Alarms...)				x			
Financial					x		
Rates				x			
Budget & Capital Imp. Plan	*Establish CIP as part of updated GP by Jan 1, 2016*				x		
Other		x					

N/A - Not Applicable
Rec - Recommendations Made
NotEv - Not Evaluated
Def - Deficiencies Identified
NoD/R - No Deficiencies/Recommendations Made
SigDef - Significant Deficiencies Identified

WATER SYSTEM SANITARY SURVEY

GENERAL

Basic Information

WSSN:	02270	Supply:	City of Fenton	County:	Genesee
Dates:	4/27/15, 5/20/15, 5/28/15	Reviewed by:	Michael Prysby	District:	11 - Lansing

Primary Contact:	Dan Czarnecki	Copy To:	Steve Guy
SDWIS Role:		SDWIS Role:	
Title:	Director of Public Works	Title:	Water Plant Superintendent
Telephone:	810-629-2261	Telephone:	810-714-0528
Cell Phone:		Cell Phone:	(810) 614-1761
Pager:		Pager:	
Fax:		Fax:	
e-mail:	dczarnecki@cityoffenton.org	e-mail:	sguy@cityoffenton.org
Address:	301 South Leroy	Address:	301 South Leroy
	Fenton, MI 48430		Fenton, MI 48430

Population:	11,746	Year:	2010	Basis:	2010 Census

Operator Certification

Distribution Classification:	S-2	Certification	Op. #	Exp. Date
Operator in Charge:	Donald Fralick	S-1		
Backup Operator:	Al Maddox	S-3		
Other Operators:	Thomas Wright	S-2		

State Rated Treatment Capacity: 4 MGD

Treatment Classification:	F-2	Certification	Op. #	Exp. Date
Operator in Charge:	Stephen Guy	F-1		
Backup Operator:	Robert Stucker	F-2,S-2		
Other Operators:	Geoffray Feit	F-3, S-3, D-5		
	David K. McKeen	F-3, S-1		
	James Brayak	F-4		

Do the operators receive adequate technical training? Yes

If not, what and why?

Comments:

The water system serving the city of Fenton consists of four wells piped to a 4.0 MGD lime-soda softening treatment facility. The water treatment plant (WTP) was constructed in 2003 and placed into service in 2004.

Treated water is distributed to a network of transmission and distribution mains providing service to a population of approximately 12,000. System storage is provided at the top of Denton Hill by use of two ground storage tanks (1.0 million gallons (MGAL) & 0.5 MGAL). A small in-line booster pump station is also provided for a subdivision in the vicinity of the ground storage tanks to help provide sufficient operating pressure.

Ownership

Ownership:	City	
Consent Agreement:	NA	
Escrow Account:	NA	
Annual Fee:	Paid	(Paid, Unpaid, Exempt, Etc.)
Comments:		

SOURCE

Well Construction and Pump Information				
BASIC DATA				
Well Name/Number	5	6	7	8
Wellogic ID	25000000504	25000000505	25000000506	25000014508
SDWIS Facility ID (Site Code)				
Well Log Available?	yes	yes	yes	yes
Constructed Date	1965	1965	date not provided	2003
Well Status	Op.	Op.	Op.	Op.
Well Status Date				
Treatment at Well	None	None	None	None
SDWIS Entry Point ID (Site Code)				
Treatment at Entry Point	LS softening	LS softening	LS softening	LS softening
GPS Coordinates Latitude	42.805196	42.806629	42.806961	42.807681
Longitude	-83.729637	-83.735213	-83.736291	-83.735921
Operator Visit Frequency	1/week	1/week	1/week	1/week
Comments:				
WELL CONSTRUCTION				
Grout Type	Neat Cement	Neat Cement	Neat Cement	Neat Cement
Rock or Drift	drift	drift	drift	drift
Casing 12" Above Grade	Yes	Yes	Yes	Yes
Total Depth	68 ft	91 ft	92 ft	100 ft
Casing Depth	37 ft	48 ft	not provided on log	80 ft
Casing Diameter	34-in	34-in	34-in	16-in
Gravel Pack Dimensions				
Gravel Pack Material				
Screen Length		20 ft		20 ft
Screen Diameter		16-in		16-in
Screen Slot Size				0.05
Comments:				
WELL PUMP INFORMATION				
Pump Type	VT	VT	VT	VT
HP	30 HP	40 HP	30 HP	100 HP
Permit Capacity (GPM)				
Permit TDH				
Current Capacity (GPM)	500 gpm	1120 gpm	1120 gpm	1000 gpm
Current TDH	80 ft	79 ft		
Basis for Current Capacity	pump test - 2015	pump test - 2014	pump eff. Test	pump eff. Test
Pump Setting	52.5 ft	65 ft	not provided on log	
Static Water Level	31.5 ft			31 ft
Pumping Water Level (24 hr)	41 ft	35.5 ft	65 ft	71 ft
Pumping Water Level (100 day)				
Last Cleaning				
Last Pulled for Inspection	2015	2014	2009	2009
Last Efficiency Test	2015	2014	2009	2009
Phase/Surge/Lightning Protection				

Comments:

Well #5: This well was re-habilitated by Peerless-Midwest. The pump, motor, and drop pipe was removed in April 2015 (first survey visit). Chemical cleaning and installation of a VFD was also completed. The pump efficiency test confirmed an increase in capacity from 330 gpm to 500 gpm.

Well #6 and #7: Each wellhouse has been refurbished and includes replacement of the roofs. The pump and motor in Well #7 was pulled and overhauled in 2009. A visual TV inspection of the well was also performed and the well was found to be in good condition. New drop pipe was also installed. Well #6 had routine pump and motor maintenance performed in 2014. The isolation valve and check valve were replaced during the maintenance.

Well #8: This well was constructed in 2003 along with the new WTP. The wellhouse is relatively new and in good condition. The pump and motor was pulled in 2009 for routine maintenance and will be scheduled again in 2016. VFD controls will also be added at Well #8 in 2016.

Copies of the well efficiency reports for Wells #5, 6, 7, and 8 are available at the WTP.

The city also utilizes Peer-Less Midwest to perform annual maintenance on all four production wells which includes yearly pump performance tests.

DEQ Conclusions & Recommendations:

Maintain a proactive well maintenance program. Schedule Wells #7 and #8 for routine pump and motor maintenance within the next one to two years.

SOURCE

Well Appurtenances				
Well Number	5	6	7	8
WELL APPURTENANCES				
Well Seal or capped	Yes	Yes	Yes	Yes
Pump to Waste Piping	Yes	Yes	Yes	Yes
Screened?	No	Capped	Capped	Capped
Air/Vac Relief	Yes	Yes	No	Yes
Screened?	No	No	N/A	No
Casing Vent	Yes	Yes	Yes	Yes
Screened?	Yes	Yes	Yes	Yes
Check Valve (VT or Sub)	Yes	Yes	Yes	Yes
Meter	at WTP	at WTP	at WTP	Yes
Raw Sample Tap	Yes	Yes	Yes	Yes
Chemical Injection Tap	at WTP	at WTP	at WTP	at WTP
Plant Tap	N/A	N/A	N/A	N/A
Appropriate Chemical Feed Outlet	No	No	No	No
Water Level Device	Yes	Yes	Yes	Yes
Pressure Gauge	Yes	Yes	Yes	Yes
Pressure Relief Valve				
Comments:				
Each well house is well maintained.				
WELL CONTROLS				
Run Timer				
H-O-A Switch	yes	yes	yes	yes
Alternating Relay				
Operating Pressure				
Control Signal Type	SCADA	SCADA	SCADA	SCADA
Control System Adequate?				
Comments:				
Controls are monitored through SCADA. Operators manually alternate wells.				
WELLHOUSE INFORMATION				
Heater / Dehumidifier	Ele.	Ele.	Ele.	Ele.
Floor Drain	Yes	Yes	Yes	Yes
Doors open out	Yes	Yes	Yes	Yes
Adequate Security Measures?	Yes	Yes	Yes	Yes
Comments:				
Each well house has intrusion alarms, flood, and low temperature alarms. An alarm signals the autodialer to contact appropriate staff on call. Each wellhouse is now fenced.				

Standby Power				
WELL AUXILIARY POWER				
Well Number	WTP & Well #5	Wells 6, 7 & 8		
Power Type	Generator	Generator		
Power Rating (kWh or KVA)	500 KW	185 KW		
Fuel Type		Natural gas		
Secondary Containment				
Capacity (gpm)	WTP & Well 5	Capacity of one well		
Starting Frequency		weekly		
Load Testing Frequency		needs to implement		
Basis for Auxiliary Power Waiver				

Comments:

Standby power is provided for the WTP and can also operate Well #5. A 185 KW generator is at Well #8 and can provide power to Wells #6 & 7. Bridgeway Power performs yearly maintenance for the stand-by power generators.

DEQ Conclusions & Recommendations

Operate the stand-by power generation system under load on a yearly basis

SOURCE

Isolation				
Well Number	5	6	7	8
Approved Isolation Radius	100 ft	100 ft	100 ft	100 ft
Available Isolation Radius	>100 ft	>100 ft	>100 ft	>100 ft
Type of Isolation Control	Mun. own	Mun. own	Mun. own	Mun. own
GW flows from/direction				
Basis for GW Flow				
Important Potential Source				
Distance and Direction				
Important Major Source				
Distance and Direction				
Detects	None	None	None	None
Sensitivity				
Susceptibility				

Wellhead Protection/Source Water Protection Program

Is the Source Water Assessment available? (Y/N)		No	
Date of last update			
Is there an approved Wellhead Protection Program (WHPP)? (Y/N)		Yes	
Date of DEQ approval		10/12/2005	
Have any of the following been initiated? (Y/N)			
Wellhead Protection/Source Water Protection Team			
Delineation/Tritium Designation	Yes	Tritium Results	< 1
Contaminant Source Inventory			
Management Strategies for Contaminant Sources/Land Use			
Contingency Plan addressing wellhead area			
Plan for phasing new wells into WHPP			
Public Participation			
What is status of wellhead delineation/tritium designation?	expired 1/2/2015	(ongoing, or date of DEQ action)	
Have Source Water Protection efforts been initiated? (Y/N)	not maintained	(if yes, briefly describe)	

Comments:

Fenton was requested to update their WHPP in 2013; however, no further action has been taken. The approval status expired on 1/2/2015.

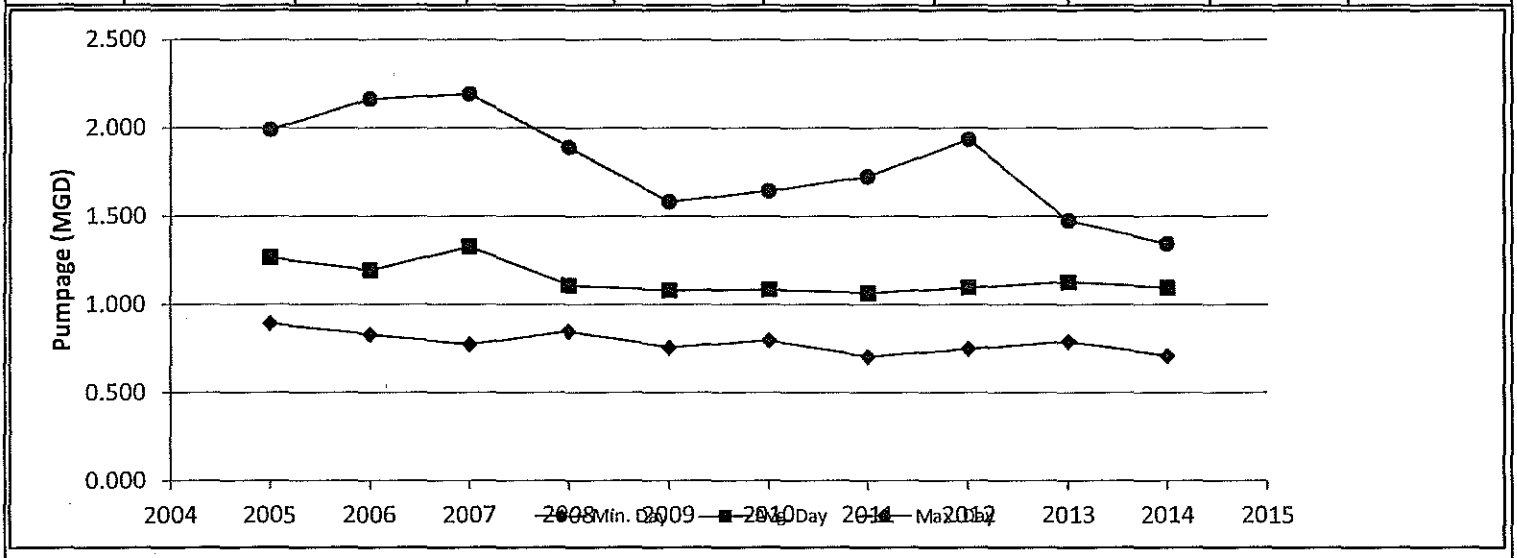
DEQ Conclusions & Recommendations

Resume WHPP activities as part of updating the program and to re-achieve active program status. Re-examination of sources of contamination within the city's wellhead protection area and an evaluation of past and current practices to minimize threats to the source water are necessary as part of re-implementing the city's WHPP. Further guidance for WHPP implementation is available at http://www.michigan.gov/deqwhp.

SOURCE

Capacity

Year	Pumpage (MGD)					Max/Avg	Population History	G/C/D	% unacct.H_2O
	Max. Day	Date	Avg. Day	Min. Day	Date				
2005	1.992	2-Mar	1.267	0.894	25-Dec	1.57			
2006	2.164	17-Jun	1.195	0.830	25-Dec	1.81			
2007	2.193	25-Jul	1.329	0.775	25-Dec	1.65			
2008	1.893	18-Oct	1.109	0.849	25-Dec	1.71			
2009	1.583	9-Jul	1.081	0.757	25-Dec	1.46			
2010	1.645	7-Jul	1.085	0.797	1-Jan	1.52			
2011	1.726	17-Jul	1.065	0.705	25-Dec	1.62			
2012	1.937	27-Jun	1.097	0.749	1-Jan	1.77			
2013	1.478	17-Jul	1.129	0.791	31-Mar	1.31			
2014	1.345	26-Jul	1.096	0.710	25-Dec	1.23			



Five Year Max. Day	1.937			
Ten year Max. Day	2.193			
Five Year Avg. Day	1.094			
Max Day for capacity requirements	2.193			
Baseline Capacity	3,960	gpm	5.706	MGD
Total Well Capacity	3,740	gpm	5.389	MGD
Firm Well Capacity	2,620	gpm	3.775	MGD
Firm Well Capacity/Max. Day	172%			
Total Aux. Power Well Capacity	1,450	gpm	2.089	MGD
Aux. Power Well Capacity/Avg. Day	191%			

Comments:

Metering has been provided for WTP process water and at the fire hall. Metering has also been installed at a local restraunt. Several governmental buildings in the downtown remain un-metered. The city's unaccounted water has dropped to between 12 and 15% with the additional meters that were installed.

Fenton's total and firm well capacity increased following completion of the work on Well #5.

DEQ Conclusions/Recommendations:

Provide meters for the remaining un-metered customers in the downtown area.

WATER TREATMENT PLANT

The Fenton WTP is a lime softening plant practicing aeration, solids contact (upflow clarification), re-carbonation, filtration, disinfection, and fluoridation of groundwater from four production wells. A plant schematic flow diagram is provided in Appendix A.

The WTP has 2 upflow clarifiers, 2 recarbonation tanks, 4 filters, and one clearwell. The rated capacity of the WTP is 4.0 MGD with a firm well capacity of 3.78 MGD. The WTP is designed for 2-stage softening; however, the plant is currently being operated in single stage mode through one of the two clarifiers. The second clarifier is brought into operation if treatment rates exceed 2.0 MGD. The WTP has the capability to be expanded to 5.0 MGD based upon the hydraulic capacity of the clarifiers and internal piping.

WTP winter operation is carried out in two 10-hour shifts (6am - 4pm and 10am-8pm). Two shift operators in addition to the OIC are present between 10am and 4pm. Summer operation is carried out in 2 shifts (6am-4pm and 2pm-12am). Two shift operators in addition to the OIC are present between 2pm and 4pm.

Water System Construction Features and Dates:

1. The Fenton iron removal treatment plant was constructed in 1959 and placed into service in 1960.
2. Wells #5, #6, and #7 were constructed in 1960.
3. Mid 1990s - Iron removal plant improvements including chlorine room modifications and yard piping improvements were completed.
4. Late 1990s - An additional 0.5 MGAL ground storage tank is constructed at the top of Denton Hill.
5. 2000-2005 - A new 4.0 MGD lime-soda softening plant is constructed and the old iron removal plant is razed. A fourth well (Well #8) with a capacity of 1,000 GPM is constructed.

Plant Design Capacity:	4	MGD		
State Rated Capacity:	4	MGD		
Source Water Capacity				
Total Well Capacity	3,740	gpm	5.39	MGD
Firm Well Capacity	2,620	gpm	3.78	MGD
Firm Well Capacity/Max. Day				
Water Usage				
Five Year Max. Day	1.94	MGD		
Ten year Max. Day	2.19	MGD		
Five Year Avg. Day	1.09	MGD		
Max Day for capacity requirements:	2.19	MGD		
Total Treated Water Storage				
Treatment Plant				
Clearwell:	0.13	MG		
Distribution System				
Elevated Storage:	none	MG		
Ground Storage:	1.5	MG		
Total Storage	1.57	MG	- see comments	
Percent of Maximum Day:	72%			
Emergency Supply/Interconnections:	none			

Demand/Capacity/Storage Comments:
Fenton has a 1.0 MGAL and 0.5 MGAL ground storage tank at the top of Denton Hill. The elevation of Denton Hill allows these tanks to function as an elevated storage tank. The overflow elevation of each tank differs by approximately 14-inches which does not allow the top 60,000 gallons of the 1.0 MGAL tank to be used.

Both tanks were inspected and cleaned in 2014 by Utility Services. See Page 29 for further discussion regarding the condition of the tanks and DEQ's conclusions and recommendations.

Maximum day demands have shown a decrease over the past ten years and currently range between 1.5 and 2.0 MGD.

2015 Water Quality - Lime Softening Plant

	Raw		Treated	
	Average	Range	Average	Range
Fluoride, ppm	0.24	0.17-0.55	0.90	0.11-1.20
Turbidity, NTU	0.767	0.064-5.42	0.035	0.017-0.055
pH	7.11	6.96-7.28	8.61	7.99-9.33
Hardness as $CaCO_3$, ppm	513	412-584	147	102-224
Alkalinity, ppm	328	267-368	87	60-153
Calcium, ppm	361	295-430	126	71-175
Iron				
Total Coliform, cts/100 ml	0		0	

Monitoring Requirements: See Monitoring Schedule; Appendix B

Water Quality/Monitoring Requirements Comments:

The city has met all of the drinking water monitoring requirements and maintains compliance with all of the applicable drinking water standards.

Pumps and Pump Locations

Well Pumps

	Location	Capacity	Type	Lubricant	Status	PM	Flooding?
Well #5	WTP	500 GPM	VT	oil/grease	active	Peer-less	no
Well #6	WTP	1120 GPM	VT	oil/grease	active	Peer-less	no
Well #7	WTP	1120 GPM	VT	oil/grease	active	Peer-less	no
Well #8	WTP	1000 GPM	VT	oil/grease	active	Peer-less	no

Firm Well Capacity: 3.77 MGD

High Service Pumps

	Location	Capacity	Type	Lubricant	Status	PM	Flooding?
#1	clearwell	1200 GPM	VT	oil/grease	active	Peer-less	no
#2	clearwell	1200 GPM	VT	oil/grease	active	Peer-less	no
#3	clearwell	1200 GPM	VT	oil/grease	active	Peer-less	no
#4	Clearwell	1200 GPM	VT	oil/grease	active	Peer-less	no

Firm Capacity: 5.2 MGD

Other WTP Pumps

	Location	Capacity	Type	Lubricant	Status	PM	Flooding?
2 Clarifier Re-Circ Pumps	cone floor	700 GPM	HC	water	active		no
1 clarifier drain	cone floor	400 GPM	HC	water	active		no
2 Waste Wash Water	sublevel	500 GPM	Sub	coolant	active		NA

Location of Pump Switch Gear:
The WTP main pump switch gear is located at the rear of the WTP and is not subject to flooding.

Comment on Pumps/Pump Maintenance:

The WTP has four high service pumps. A lightning strike in July 2011 took 3 of the 4 pumps out of service. The pump drivers had to be replaced and the pumps were placed back into service. Full lightning surge protection needs to be provided to prevent this problem from recurring. Electrical maintenance is to be scheduled in 2015 that includes an arc-flash study.

The clarifier recycle pump is used to induce rotation within each claricone during start-up. These pumps use water from the recarbonation tanks for start-up.

The high service pumps are located above the clearwell and are not subject to flooding. The clarifier re-circ. pumps and clarifier drain pumps are located in the WTP sublevel adjacent to the claricones and would be subject to flooding in the event of a significant pipe failure.

The wasted washwater from filter backwashing is temporarily stored in the waste washwater storage tank. This water is pumped back to the plant influent via the waste wash water pumps. The 70,000 gallon washwater storage tank can hold 2 backwash volumes. The tank also has an overflow to a storm water catch basin.

Sludge produced during clarification is sent by gravity to a 2-celled sludge lagoon. Both clarifiers can also utilize the 400 GPM clarifier drain pump, if needed, to pump sludge to the sludge lagoon; however, sludge is primarily conveyed by gravity.

Pump Controls: The high service pumps are controlled by the SCADA control system. Pump operation is established by the water level in the ground storage tanks at the top of Denton Hill. These pumps can also be manually operated. Each pump has a soft start drive.

The well pumps and high service pumps are on an annual pump-test and maintenance schedule and the work is performed by Peerless-Midwest. WTP staff also grease and lubricate all pumps as needed.

DEQ Conclusions/Recommendations:
Pursue surge protection protection for the main pumping components at the treatment plant.

TREATMENT FACILITIES

AERATION

Type:	Splash aerator with head tank
Height:	63 ft.
Diameter:	5 ft.
Overflow:	
Number Aeration Trays:	4
Aeration Chamber Diameter:	ft.
Inlet/Outlet Pipe:	yes
Condition of Equipment:	see comment
Bypass:	yes

Head Tank Comments:
Tray aeration at an application rate of 16.3 gpm/sqft is provided. Raw water is pumped from the wells to the aerator having 4 trays with screened intakes. Raw water enters the head tank that provides aeration necessary for iron removal. Raw water from the head tank is then directed to the bottom of the rapid mixing chamber of the claricone. The head tank is positioned higher than the cone to supply pressure to lift the sludge blanket inside the cone. Chlorine is added immediately upstream of the raw water meter and aerator to help reduce scaling within the aerator unit.

DEQ Conclusions and Recommendations:
Our inspection revealed several breaks in the air intake screens. In-tact air intake screens are necessary in preventing insects from gaining access to the aeration system. Routine inspection of the intake screens and replacement/repair on an "as needed" basis are essential in protecting the sanitary integrity of the aeration system.

CLARIFIERS

Number of Units:	2 Treatment Units		
Type of Units:	CBI Walker Claricone		
	East Unit	West Unit	
Volume of Each Unit, MG:	0.175	0.175	
Rated Capacity, MGD:	4	4	
Clarification Rates, gpm/ft^2:	1.28	1.28	(10 States ≤ 1.75 gpm/ft.)
Detention Time at rated capacity, hours:	.87 hrs	.87 hrs	(10 States 1 to 2 hours)
Inlet Design:	NA		
Baffles:	None		
Outlet Design:	Adjustable plate effluent launder		
Baffling Factor:	poor - 0.1		
Overflow:	Yes - to waste washwater tank		
Drains:	one 6-inch sludge drain line to sludge lagoon		
Curbing:	4-in curbing, 4-in kick plates and 1 1/2 inch handrails		
Sludge Removal Method:	Gravity (majority), HC pump for last part of drawdown		
Sludge Disposal:	Sludge lagoons behind WTP		
Physical Condition:	Both claricones and appurtenances need re-coating		

Does preventive maintenance program exist?
Effluent turbidity, average/range: Average: _____ Range: 0.3 -0.7 NTU

Flocculation Area:
Short Circuiting:
Inlet design: side inlet to induce rotation
Is mechanical flocculator used? no
Condition of equipment: needs re-coating
Baffles: none

Lime Softening:
Water from the head tank is typically directed to the base of the cone of West Unit followed by the East Unit (treatment in series). The West unit is not in service and softening is completed in the East unit. Lime slurry, ferric chloride, and caustic soda are applied at the center of the mixing chamber and rapid mix is hydraulically induced within the mixing chamber. The upward flow of water in the claricone forms the sludge blanket. Each claricone is equipped with a 6-inch waterstart line from each clarifier re-cycle pump and is designed to stir up settled sludge and induce hydraulic motion. Water from the re-carbonation tanks are used for start-up. Clarified water is collected at the top of claricone through an effluent launder that spans from the center to the outer edge. The launder is adjustable from the center of the cone 6-inches up or down.

DEQ Conclusions and Recommendations:
The epoxy coating system in each clarifier is showing deterioration. Replacement of epoxy coating system is recommended within the next one to two years. All epoxy coating systems that are in contact with potable need to approved under ANSI/NSF Standard 61.

RECARBONATION TANK

Tank:	East	West	
Size, ft:	31 ft	31 ft	
Volume, gal:	4,550	4,550	
Detention Time, min:	1.6 min	1.6 min	at 4.0 MGD
CO_2 Storage, tons:	14 tons total storage		
Minimum Days of Storage, days:	70 days		
Feed System:	Two Tomco feeders each rated at 42 lbs/hr		

Comments:
A pressurized solution feed system is utilized for re-carbonation. The system injects CO2 into the solids contact effluent piping. Approximately 100 seconds of detention time is provided in each contact tank at plant rated capacity. Continental Carbonic is the chemical supplier.

FILTRATION

Type of filter:		Mixed media
Number of Filters:		4
Filter Dimensions, ft:		16' X 16'
Area of Filters, ft^2:		256 sqft
Design Filtration Rate, gpm/ft^2:		2.71 gpm/sqft
Approved Filtration Rate, gpm/ft^2:		3.62 gpm/sqft
Maximum experienced filtration rate, gpm/ft^2:		1.80 gpm/sqft
Is flow equalized through all filters?		yes
Rate of flow device:		none
Filter to waste available?		yes
Filter hours:	Average:	60-80 hrs
	Maximum:	80 hrs
	Minimum:	60 hrs

Filter Media - Filters 1 - 4

	Anthracite	Sand
Depth - inches	18-in	12-in
Effective size (mm):	1.0 - 1.2	0.45 - 0.55
Uniformity coefficient	< 1.5	< 1.6
Specific gravity	1.62	2.65

Date Last Rebuilt or Checked:	2006 & 2007
Underdrain Type:	False bottom above true bottom with ABS plastic media retaining nozzles
Curbing:	4" kickplate w. 42" handrail
Filter Overflow:	16" OF to waste Washwater tank
Surface Wash:	None
Depth of Water Above Media:	approx. 81-in
Filter Performance Records:	yes

Filter Comments:
The filter box walls were repainted due to poor workmanship with the original painting. Boxes 1 and 3 were repainted in 2006 and boxes 2 and 4 were repainted in 2007. The project required removal of all of the filter media to a temporary storage location. The media was noted to be in good condition.

Phosphate is being added to the applied water to reduce the potential of cementing of the media. Filter run times and turbidities are monitored and reported on the MOR. Time/turbidity graphs are compiled and the information is stored in the WTP's SCADA system.

Utility Services assisted WTP operators in collecting filter core samples for a sieve analysis in 2011. The results of the analysis showed media deposits (iron, manganese, carbonic scale, and chlorine reactive material) on the filter media sand. Utility Services recommended treatment of the filter media and removal of the sand attached to the underdrains in order to improve backwash flow, extend the useful service life of the sand media, and reduce chlorine demand across the filters. Further maintenance activities including; raking, probing, and excavation have not been fully implemented.

DEQ Conclusions/Recommendations:

Proceed with filter media cleaning and establish a full preventative maintenance program for the treatment plant filters. Although there is no specific criteria or maximum service time prior to rehabilitating filters, it is clear that a proactive filter maintenance program can extend the service life of a filter and ensure treated water quality. Occasional recapping of filters with anthracite to replace lost fines will help maintain the appropriate media depth. Regular rodding and/or raking of the media is recommended to minimize cementing or mudball formation and to keep the media in good operating condition. In addition, gravel mounding checks and core sampling should be performed to confirm that backwashing has not disturbed the support media or gravel. Sieve analysis should also be used to determine media size distribution, condition, and the extent of attrition.

In addition to completing the recommendations Utility Services, we recommend that plant staff perform thorough inspections of the media in each filter on an ongoing basis in the future. A formal filter evaluation or surveillance program would provide a better idea of the condition of the filter and media.

A program of this type might include:
1. General filter inspections
2. Review of water quality and operational information
3. Filter media expansion measurements
4. Gravel mounding measurements
5. Free board to media measurements
6. Box excavations (media profile)
7. Core sampling and media examination

This type of program, if implemented, must be performed on a frequent basis so that comparisons can be made over time. In addition, detailed record keeping should accompany the program so that findings can be summarized and later evaluated.

Turbidimeters

Is there continuous turbidimeter for each filter?	yes	Calibration frequency:	1/6mo
Is there continuous turbidimeter for the applied?	no	Calibration frequency:	
Is there continuous turbidimeter for confluence?	yes	Calibration frequency:	1/6mo
Turbidimeter used for combined compliance:	no	Calibration frequency:	1/6 mo.

Comments on Filter Construction/Maintenance/Turbidity measurements:
Turbidity monitoring is performed at incoming raw water (prior to lime feed, applied water, individual filter effluent, and plant tap - filter confluence. The WTP has continuous turbidity monitoring for each filter and filter confluence; however, grab samples are taken for compliance. All turbidimeters all calibrated once every 6 months or more often if needed.

Backwash:

Average runtime of filter, hours:	60-80 hrs	
Criteria for backwash: Max Turbidity:	0.45	Ntu
Max Filter Runtime:	120	hours
Source of backwash water:	In service filters plus supplemental supply from HS pump discharge	
Average duration of backwash, minutes:	10-15 min	
Maximum duration of backwash, minutes:	20 min	
Average backwash flow, gpm:	1250 gpm	
Maximum backwash flow, gpm:	3840 gpm - based on 15 gpm/sqft	
Maximum backwash rate - gpm/sq. ft:	15 gpm/sqft	
Is bed expansion achieved?	yes	
Is there loss of media during backwash?	trace - mostly fines and flats	

Backwash disposal

Backwash water discharge location:	
Is backwash water recycled?	yes
Are other streams recycled?	no
Location of recycled stream into plant flow:	Raw water influent just inside bldg.
Typical recycled flow rate (gpm):	11,000 - 15,000 gallons per day
Is treatment/equalization provided prior to recycling?	no

Associated problems with filters:
(Yes/No)

Air Binding -	no	Media Growth -	no
Cementing -	no	Media Attrition -	no
Gravel Mounding -	no	Bacteria Growth -	no
Media Loss -	trace	Uniform Backwash -	yes
Adequate Backwash Rate -	yes	Mudballs -	no

Filter Backwash Operation comments:
There is no filter backwash pump and backwash source is from the 3 remaining filters in service via gravity with supplemental supply from the high service discharge (dist. assist). The filter backwash is initiated by increasing the height of a movable weir on the clearwell influent; thus, directing the remaining in-service filtered water for backwashing. Backwashing through the supplemental supply has not been used.

Backwash water is sent to a 70,000 gallon waste washwater tank for temporary storage prior to being re-circulated to the solids contact treatment unit.

PLANT TREATED WATER CLEARWELL

Location:	NE corner of WTP below HS pumps
Volume, MG:	27' X 33' X 20.3' - 130,000 gal
Percent above grade:	NA - Part of WTP bldg
Low water level, ft:	6.67' - 44,653 gal
Operating range:	13 ft - 86,640 gal
Isolation capabilities:	none
Vents:	3-inch vent inside HS pump room
Reservoir Baffling:	none
Drains:	none
Overflow:	24-inch OF to storm water retention basin

Comments on Clearwell:
The clearwell can be drained via the HS pumps down to approximately 60-inches, then a portable pump is needed to drain the remainder of the tank. Two 3FT X 3FT access hatches are provided - one at the NE corner of the high service pump room and a second hatch near the west side of the clearwell above the filter effluent chamber. The clearwell has level alarms of which the high level alarm notifies thru a dialer system. The low level alarm automatically shuts down the HS pumps. The clearwell is relatively new; however an inspection should be performed within the next few years.

CHEMICAL FEED

Comments on Chemical Feed:
WTP operators add nine types of treatment compounds to optimize treatment and include; lime and caustic soda for softening, carbon dioxide for pH adjustment, chlorine for disinfection, ferric chloride for improved clarification, fluoride for oral health protection, sodium hexametaphosphate as a filter conditioner, orthophosphate for distribution system corrosion control, and an anionic polymer as a softening aid. Chemical usage is determined by weigh scales, radar level sensors, and/or graduated side scale. All chemical additives are ANSI/NSF Standard 60 compliant. The chemical feed and storage areas are located at the rear of the WTP (west end of bldg).

PLANT PIPING AND MISCELLANEOUS

Low service discharge	12 and 16-inch raw water lines from wells to WTP
Settled water effluent	Two 16-inch lines
Filtered water effluent	Four 16-inch lines
High service suction header	NA
High service discharge, inc:	One 16-inch line
Backwash	Four 16-inch lines
Surface wash	NA
Wash water drain	One 10-inch line
Sludge drain	Two 4-inch lines
Plant service line	One 6-inch line

Do any roof drains or other drains enter treatment process? no

Pipe Color Coding: yes

Plant Cross Connections and Common Walls:

Filter gullets?	no
Common walls?	Air gap between influent well and filter wall
Chlorine feed room?	Protected by RPZ on process water line
Plant water RPZ?	6-inch RPZ
Chemical feed areas?	Yes
Surface wash?	NA
Boiler?	Internal coolant not connected to WTP process water
Dishwasher?	
Dehumidifier?	

Comment on Plant Piping Miscellaneous:
All testable devices at the WTP are tested on an annual basis by HDI.

DEQ Conclusions/Recommendations:
Filter gullets and clearwells should be inspected when each treatment train is taken out of service and inspected for cracks and properly repaired if discovered. A more comprehensive inspection of the clearwell should be performed within the next several years.

PLANT METERING AND CONTROLS

Plant Water:	6-inch Ultra-sonic
Raw Water Metering:	12-inch magnetic
High Service Metering:	12-inch magnetic
Backwash Water Metering:	None - determined by flow rate
Sludge Discharge:	6-inch magnetic

Plant Controls:

Chemical Feed	
Chlorine -	PLC controls four feed points
Lime -	Hands-on and PLC
CO_2	PLC
Fluoride -	PLC controls one feed point
Chemical transfer pumps:	none
Filters -	semi-auto control from panel & manual control
Filter Backwash -	semi-auto control from panel & manual control
Low Service Pumps -	auto & manual from SCADA
High Service Pumps -	auto & manual from SCADA
Elevated Tanks -	auto control of HS pumps

Security:
Comments: Intrusion alarms are provided at each wellhouse and each door has a dead-bolt lock. The WTP is fenced except for the front. Motion detectors are provided in each room with a dialer that notifies the water plant OIC. The ground storage tank site is fenced and equipped with motion sensors. Alarm conditions are sent to the WTP OIC via alarm dialer. Six security cameras have been installed at the WTP and ten additional cameras will be installed on WTP grounds as the second phase of the WTP's enhanced security program.

Flexibility in Operation:

Operation	Unit Bypass
Head Tank	yes
Claricone	yes
Filters (Individual)	yes
Recarbonation Tank	no
Clearwell	no
Wells	yes
WTP	yes

Plant Alarms:

Basement Flooding -	yes	High Service Pump Discharge Pressure -	no*
Chlorine Leak (day tank liquid level)	yes	Clearwells -	yes
Chlorine Supply -	yes	Ground Storage tanks -	yes
Filter Level -	yes	Elevated tank loss of signal -	yes
Individual filter turbidity -	yes	Main Control System Failure-	no
CFE turbidity -	yes	Backwash Holding Tank -	yes

Comment of Plant Metering and Controls:

Many of the alarms including CL2 supply, filter level, filter turbidities are conveyed via the SCADA system. The storage tanks including BW holding, clearwell, and ground storage tanks are equipped high and low level alarms.

* The high service pump discharge has a pressure release valve set at 170 psi.

Well #8 can be used to bypass the entire WTP as its pump matches system TDH. The pump operates at 80% for WTP operation. A portion of the WTP (head-tank and clarifiers) can also be bypassed and flow pumped directly to the filters if needed.

Valve Operation:
Are critical valves exercised on a routine basis?

Valve Location and Operation	
High Service Isolation valves	yes
Clearwell Valves	yes
Infl/Effl pretreatment basin valving	yes - during BW
Plant Bypass	not performed
Yard Piping	

Comments:
A WTP valve operating program is in place. 82 large valves (4-in - 16-in) are operated at the WTP on an annual basis and their status is tracked on a spreadsheet.

Interruptions in Operation: None

Sludge Lagoons

Constructed:	2003	Dimensions: Length:	ft
Cells:	2	Width:	ft
Capacity:	yd³/cell		
Sludge Disposal:	Agricultural appl - North cell cleaned in 2014, South Cell due 2016		
Overflow:			
Outlet:			

Security:

Gate Locked:	Yes
Fence:	Yes
Warning Signs:	Entrance

Discharge of treatment plant sludge to the sludge lagoon is performed under the provisions of the groundwater discharge permit GW1010298 issued 9/25/2013. The WTP has maintained compliance with their current groundwater discharge permit. The most recent permit allows a maximum volume discharge compliance of 25,000 GPD with volume based on 40% of metering flow and 60% being solids. The new permit also allows for a maximum 100,000 gpd discharge for clean-out operation. GW1010298 will expire on October 1, 2017.

The city removed lime sludge from their North lagoon in 2014. The excess sludge is disposed off-site for agricultural use and the work was completed in accordance to WHMD's requirements for off-site disposal.

LABORATORY

Parameter	EPA or Standard Method and Analytical Equipment	Calibration Frequency	Sample Points	Sample Frequency
Alkalinity	Colorimetric		Raw Water	2/day
			Clarified Water	1/4hrs
			Plant Tap	1/4hrs
Chlorine	Colorimetric	Zero our each sample	Applied Plant Tap Distribution	1/2hrs 1/2hrs 2x/mo
Fluoride	Titration Tisab III	Daily	Plant Tap	1/day
			Distribution	weekly
Hardness	Colorimetric		Raw Water	2/day
			Clarified Water	1/4hrs
			Plant Tap	1/4hrs
pH	pH Probe	Daily	Clarifier top/bottom	1/4hrs
			After CO2 appl	1/4hrs
			Applied	1/4hrs
			Plant Tap	1/4hrs
Temp.	Thermometer	Daily	same	1/day
Iron				
Turbidity	2100 A Turbidometer	Each sample	Raw Water	1/4hrs
			Applied Water	1/4hrs
			Plant Tap	1/4hrs
Total Coliform	Colilert	NA - Lab Certification	Raw Water Filter Effluent Plant Tap & Dist.	1/day 1/day 1/day & 10/mo.

Laboratory Certification:

Renewal Date: 3/13/2014

1 _____

2 _____

Laboratory Comments:
Laboratory certification expires on 3/28/2017.

CHEMICAL TREATMENT

Lime

Point of Treatment:	WTP	Injection Point:	Mixing chamber at ea. claricone
SDWIS Facility ID (Site Code)			
Year Initiated	2003	Purpose:	hardness reduction
Product	Hydrated lime	Manufacturer:	Carmeuse Lime
ANSI/NSF Standard 60 Approval? (Y/N)	Yes	NSF max dose:	mg/L
Normal Feed Rate/Dosage	2,755	lbs/day	
Avg Raw Water Hardness as $CaCO_3$	513	mg/L	
Avg Plant Tap Hardness as $CaCO_3$	147	mg/L	
Frequency of Testing			
Analytical Method Used	colorimetric	Instrument:	
Any Overfeed Instances? (Y/N)	no	Date(s):	
Any Low Feed Instances? (Y/N)	no	Date(s):	
Pump Type:		Model:	
Number of Pumps:	2		
Silo 1 Pump Capacity: max:	83	lbs/hour	psi
Silo 2 Pump Capacity: max:	83	lbs/hour	psi

Lime Storage	Silo 1		Silo 2	
Bulk Storage:	35	tons	35	tons
Number of Silo Tanks:	2			
Minimum Days of Storage:	30			
Slurry Pumps:	One 15 gpm slurry pump for each silo			
Slurry Tank, gal:	500		500	
Spill Protection:	No			
Piping Identification:	1.5" hard pipe (slurry pump suct), 1.5" food grade tubing			
Overfeed Protection:	NA			
Weight/Level Reading Method	Radar level indicator			

Comments:

Two 35-ton bins are provided with each bin providing approximately 30 days storage during winter operation and 45 days storage (both bins) during the summer. Each feeder converts hydrated lime to a lime slurry and the slurry is transferred to a 500 gallon slurry tank. Each slurry tank is equipped with a turbine mixer and has a radar level monitor with a high and low level alarm. Each feeder is equipped with a VFD controlled slurry pump that pumps lime slurry to the lime application point. Each pump is currently set at 14 GPM.

The lime discharge lines from each slurry tank are cleaned and flushed on a daily basis. Each tank is dismantled and cleaned thoroughly once every 6 to 8 months. Silo #1 was in service at the time of the survey. Silo #2 was not in service due to a flexible sleeve between silo and the agitator being in need of replacement; however, the repairs were recently completed and the silo is available for service.

SAFETY

Separate Room	Yes	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Training Programs	Yes
Fresh Air Vent	Yes	Shower/Eye Wash	No
Door Opens Out With Panic Bar	Yes	Alarm	No

Comments:

CHEMICAL TREATMENT

Carbon Dioxide

Point of Treatment:	WTP	Injection Point:	Recarbonation tanks
SDWIS Facility ID (Site Code)			
Year Initiated	2003	Purpose:	pH adjustment
Product	Carbon Dioxide (CO2)	Manufacturer:	Continental Carbonic
ANSI/NSF Standard 60 Approval? (Y/N)	Yes	NSF max dose:	100 mg/L
Normal Feed Rate/Dosage	62 mg/l		
Avg Raw Water pH	7.11		
Avg Plant Tap pH	8.61		
Frequency of Testing	1/4 hrs		
Analytical Method Used	pH probe	Instrument:	
Any Overfeed Instances? (Y/N)	no	Date(s):	
Any Low Feed Instances? (Y/N)	no	Date(s):	

CO_2 Storage

Bulk Storage:	14	tons
Number of Tanks:	One	
Minimum Days of Storage:	70	
Spill Protection:	None	
Overfeed Protection:		
Weight/Level Reading Method	Barton differential pressure unit	
Piping Identification:	2" on tank, 0.5" stainless steel inside WTP	

Comments:
Two Tomco feeders (42 Lbs/hr each) inject gaseous CO2 into the solids contact effluent piping prior to each re-carb tank.

SAFETY

Separate Room	Tanks outside	Extra Chemical Feed Pump or Parts	
Exhaust fan	NA	Training Programs	
Fresh Air Vent	NA	Shower/Eye Wash	
Door Opens Out With Panic Bar	NA	Alarm	

Comments:

CHEMICAL TREATMENT

Chlorine

Point of Treatment (Wellhouse Name)		WTP	Injection Point:	See CL2 feed points
SDWIS Facility ID (Site Code)				
Year Initiated		2003	Purpose:	Disinfection
Product		Sodium Hypochlorite	Manufacturer:	Jones Chemical
Chemical Strength		12.5%	Dilution:	
ANSI/NSF Standard 60 Approval? (Y/N)		Yes	NSF max dose:	mg/L
Normal Feed Rate/Dosage		3.16	mg/L	
Avg Plant Tap Residual (mg/L)	total:	0.87	free:	0.81
Avg Distribution Residual (mg/L)	total:	0.65	free:	0.6
Frequency of Residual testing	Plant Tap:	1/2 hrs	Distribution:	twice monthly
Analytical Method Used		Colorimetric	Instrument:	
Any Overfeed Instances? (Y/N)		No	Date(s):	
Any Low Feed Instances? (Y/N)		No	Date(s):	
Pump Type:		LMI Metering pumps	Model:	
Number of Pumps:		2 plus 2 spare pumps		
Pump 1 Capacity	gpd max:	LMI 460-S1 - 4.0 gph	psi:	175
Pump 2 Capacity	gpd max:	LMI 460-S1 - 4.0 gph	psi:	175
Pump 3 Capacity	gpd max:		psi:	
Pump 4 Capacity	gpd max:		psi:	
Pump 5 Capacity	gpd max:		psi:	
Bulk Chemical Storage Tank	Volume:	4000	gal, fiberglass	
Day Tank Volume		250	gal	
Weight/Level Reading Method		Grad scale on day tank &	radar level indicator	

Chlorine Feed Points:	Normally Used	Available
Influent to Head Tank	Yes	
Filter Applied	Yes	
Influent to Clearwell	No	Yes
High Service Discharge	No	Yes

SAFETY

Separate Room	Yes	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Shower/Eye Wash	No
Fresh Air Vent	Yes	Alarm	No
Door Opens Out With Panic Bar	Yes	Training Programs	Yes

Comments:
The chlorine room is self-contained since the floor is 6-feet below the WTP main floor level. There are no other chlorine gas safety features. The chemical feed rate is controlled by a calibration chamber on the suction side of the chemical feed pump.

TREATMENT

Fluoride

Point of Treatment (Wellhouse Name)	WTP		Injection Point:	Prior to clearwell
SDWIS Facility ID (Site Code)				
Year Initiated	2003		Purpose:	Fluoridation
Product	Hydrofluosilicic Acic		Manufacturer:	PVS Knollwood
Chemical Strength	25%		Dilution:	None
ANSI/NSF Standard 60 Approval? (Y/N)	Yes		NSF max dose:	6 mg/L
Normal Feed Rate/Dosage	0.7	mg/L		
Average Raw Concentration (mg/L)	0.24		Average Feed Rate (mg/L)	0.74
Avg Plant Tap Residual (mg/L)	0.9			
Frequency of Testing Raw:	daily		Plant Tap:	daily
Distribution:	weekly			
Analytical Method Used	Titration Tisab III		Instrument:	
Overfeed Protection Adequate?	Yes		Anti-Siphon Device?	Yes
Wired in Series with Pumps (Well or HS)	No		In series w/ Flow Switch?	Yes
Any Overfeed Instances? (Y/N)	No		Date(s):	
Any Low Feed Instances? (Y/N)	No		Date(s):	
Pump Type:	LMI Metering Pump		Model:	LMI AD951-939S1
Number of Pumps:	1 plus 1 back-up			
Pump 1 Capacity gpd max:	24	gpd		110 psi
Transfer pump for pump 1 gpd max:	gravity			ft
Bulk Chemical Storage Tank	1000	gal, fiberglass		
Day Tank Volume, gallons:	45		Hrs of Storage @ Min Day:	
Is a scale used to record chemical usage?	Sonic, scale, grad		Manufacturer / Model:	Scaletron M 4021
Calibration Procedure	Calibrated by Sterling Scale			
Calibration Frequency	1/year		Last Calibration Date:	4/1/2015

SAFETY

Separate Room	Yes	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Shower/Eye Wash	Yes
Fresh Air Vent	No	Alarm	No
Door Opens Out With Panic Bar	Yes	Training Programs	Yes

Comments:

Fluoride dosage is determined by the volume of acid pumped from the day tank by use of weigh scale. Drawdown from the bulk storage tank is determined by an ultra-sonic indicator. The bulk tank also has a graduated scale on the side of the tank. Adequate containment is provided for the bulk storage tank and the day tank. The fluoride feed lines are color coded. A flow switch is provided on the incoming raw water line and on the filter applied line. The flow switches are controlled by the WTP's SCADA control system and both must detect flow in order for the fluoride feed pump to be activated.

DEQ Conclusions/Recommendations:

Adjust fluoride dosage to achieve recommended fluoride concentration - revised to 0.7 mg/l.

TREATMENT

Sodium Hexametaphosphate

Point of Treatment (Wellhouse Name)	WTP		Injection Point:	Filter Applied
SDWIS Facility ID (Site Code)				
Year Initiated	2003		Purpose:	Filter aid
Product	Hypo-Clean		Manufacturer:	Water Solutions
Chemical Strength	36%		Dilution:	
ANSI/NSF Standard 60 Approval? (Y/N)	Yes		NSF max dose:	mg/L
Normal Feed Rate/Dosage	0.5	mg/L		
Average Raw Concentration (mg/L)	NA		Average Feed Rate (mg/L)	see comment
Avg Plant Tap Residual (mg/L)	NA			
Frequency of Testing Raw:	NA		Plant Tap:	
Distribution:	NA			
Analytical Method Used	NA		Instrument:	
Overfeed Protection Adequate?			Anti-Siphon Device?	
Wired in Series with Pumps (Well or HS)			In series w/ Flow Switch?	
Any Overfeed Instances? (Y/N)	No		Date(s):	
Any Low Feed Instances? (Y/N)	No		Date(s):	
Pump Type:	Peristaltic		Model:	Chem-Tech
Number of Pumps:				
Pump 1 Capacity gpd max:	48	gpd	50	psi
Transfer pump for pump 1 gpd max:				ft
Chemical Storage Tank	30	gal		
Is a scale used to record chemical usage?	weigh scale		Manufacturer / Model:	Force Flow XT 400 MA
Calibration Procedure				
Calibration Frequency	1/yr		Last Calibration Date:	4/1/2015

SAFETY

Separate Room	No	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Shower/Eye Wash	Yes
Fresh Air Vent	Yes	Alarm	No
Door Opens Out With Panic Bar	Yes - 3 doors	Training Programs	Yes

Comments:

Hexametaphosphate (Hypoclean) is supplied in 30-gallon drums and is transferred to a day tank via a hand pump. Dosage is determined by measuring the amount of product fed from the day tank based on weigh scale. The day tank also has a graduated scale along the side.

The MOR reports total phosphate dosage (combined Sodium Hexametaphosphate and Orthophosphate); thus the dosage for each compound was not available.

DEQ Conclusions/Recommendations:

Report Sodium Hexametaphosphate and Orthophosphate separately on the monthly operation report. Monitor and report plant tap and distribution system phosphate concentrations.

TREATMENT

Orthophosphate

Point of Treatment (Wellhouse Name)	WTP		Injection Point:	Filter effluent
SDWIS Facility ID (Site Code)				
Year Initiated	2003		Purpose:	Corrosion control
Product	WSU 158		Manufacturer:	Water Solutions
Chemical Strength			Dilution:	
ANSI/NSF Standard 60 Approval? (Y/N)	Yes		NSF max dose:	mg/L
Normal Feed Rate/Dosage	2.5	mg/L		
Average Raw Concentration (mg/L)	NA		Average Feed Rate (mg/L)	see comments
Avg Plant Tap Residual (mg/L)	NA			
Frequency of Testing Raw:	NA		Plant Tap:	
Distribution:	NA			
Analytical Method Used	NA		Instrument:	
Overfeed Protection Adequate?			Anti-Siphon Device?	
Wired in Series with Pumps (Well or HS)			In series w/ Flow Switch?	
Any Overfeed Instances? (Y/N)	No		Date(s):	
Any Low Feed Instances? (Y/N)	No		Date(s):	
Pump Type:	Metering		Model:	LMI B931468 SI
Number of Pumps:				
Pump 1 Capacity gpd max:	108	gpd	50	psi
Transfer pump for pump 1 gpd max:	Gravity			ft
Chemical Storage Bulk Tank	600	gal		
DayTank	40	gal		
Is a scale used to record chemical usage?	weigh scale		Manufacturer / Model:	Force Flow XT 400 MA
Calibration Procedure				
Calibration Frequency	1/yr		Last Calibration Date:	4/1/2015

SAFETY

Separate Room	No	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Shower/Eye Wash	Yes
Fresh Air Vent	Yes	Alarm	No
Door Opens Out With Panic Bar	Yes - 3 doors	Training Programs	Yes

Comments:
The amount of orthophosphate fed from the bulk tank is determined from ultra-sonic level indicator. Dosage is determined by measuring the amount of product fed from the day tank based on weigh scale. The day tank also has a graduated scale along the side. See discussion on previous page concerning phosphate monitoring.

DEQ Conclusions/Recommendations:
See previous page.

TREATMENT

Polymer - Anionic Polyacrylamide

Point of Treatment (Wellhouse Name)	WTP	Injection Point:	claricone influent	
SDWIS Facility ID (Site Code)				
Year Initiated	2003 - switched polymers in 2015		softening aid	
Product	P-142 PWG	Manufacturer:	Chemco	
Chemical Strength		Dilution:		
ANSI/NSF Standard 60 Approval? (Y/N)	yes	NSF max dose:	1	mg/L
Normal Feed Rate/Dosage	0.5 - 0.75 mg/l as product			
Average Raw Concentration (mg/L)	see comment	Average Feed Rate (mg/L)	see comment	
Avg Plant Tap Residual (mg/L)				
Frequency of Testing Raw:		Plant Tap:		
Distribution:				
Analytical Method Used	NA	Instrument:		
Overfeed Protection Adequate?		Anti-Siphon Device?		
Wired in Series with Pumps (Well or HS)		In series w/ Flow Switch?		
Any Overfeed Instances? (Y/N)	No	Date(s):		
Any Low Feed Instances? (Y/N)	No	Date(s):		
Pump Type:	Metering	Model:	LMI AP51-86TB	
Number of Pumps:	2			
Pump 1 Capacity gpd max:	24 gpd		110	psi
Pump 2 Capacity gpd max:	24 gpd		110	psi
Storage Bulk Tank	55 gal drum			
Is a scale used to record chemical usage?	yes - weigh scale	Manufacturer / Model:		
Calibration Procedure				
Calibration Frequency		Last Calibration Date:		

SAFETY

Separate Room	No	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Shower/Eye Wash	Yes
Fresh Air Vent	Yes	Alarm	No
Door Opens Out With Panic Bar	Yes - 3 doors	Training Programs	Yes

Comments:

The polymer feed system was not in use at the time of the survey. WTP staff switched polymer type, supplier, and manufacturer and placed the feed system back into operation. Application rates and chemical concentration information will be compiled as the information is reported in the MOR. The new product is supplied in 55 gallon drums with mixer and the dosage is determined through use of a weigh scale. Adequate containment is provided.

TREATMENT

Ferric Chloride

Point of Treatment (Wellhouse Name)	WTP		Injection Point:	Claricone influent
SDWIS Facility ID (Site Code)				
Year Initiated	2003		Purpose:	Improved clarification
Product			Manufacturer:	PVS Tech
Chemical Strength	37-42%		Dilution:	
ANSI/NSF Standard 60 Approval? (Y/N)	Yes		NSF max dose:	mg/L
Normal Feed Rate/Dosage	3 - 5	mg/L		
Average Raw Concentration (mg/L)	NA		Average Feed Rate (mg/L)	4.29
Avg Plant Tap Residual (mg/L)	NA			
Frequency of Testing Raw:	NA		Plant Tap:	
Distribution:	NA			
Analytical Method Used	NA		Instrument:	
Overfeed Protection Adequate?			Anti-Siphon Device?	
Wired in Series with Pumps (Well or HS)			In series w/ Flow Switch?	
Any Overfeed Instances? (Y/N)	No		Date(s):	
Any Low Feed Instances? (Y/N)	No		Date(s):	
Pump Type:	Metering		Model:	LMI B931-468 S1
Number of Pumps:	2			
Pump 1 Capacity gpd max:	228	gpd	50	psi
Pump 2.Capacity gpd max:	228	gpd	50	psi
Transfer pump for pumps 1 & 2 gpd max:	gravity			ft
Chemical Storage Bulk Tank	4400	gal		
Day Tank	110	gal	graduated scale for day tank	
Is a scale used to record chemical usage?	Ultra sonic (bulk)		Manufacturer / Model:	Pulsar Ultra 90
Calibration Procedure	see comment			
Calibration Frequency			Last Calibration Date:	

SAFETY

Separate Room	Yes	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Shower/Eye Wash	Yes
Fresh Air Vent	No	Alarm	No
Door Opens Out With Panic Bar	Yes	Training Programs	Yes

Ferric chloride is fed at the claricone influent. The amount of ferric taken from the bulk storage tank is determined by an ultra-sonic level indicator. The amount of ferric drawn from the day tank is based on graduated scale on the tank's side.

The ultra-sonic devices are not calibrated. Each delivered load is checked with a manual calibration.

TREATMENT

Caustic Soda

Point of Treatment (Wellhouse Name)		WTP	Injection Point:	claricone influent	
SDWIS Facility ID (Site Code)					
Year Initiated		2003	Purpose:	softening	
Product		Sodium Hydroxide	Manufacturer:	Jones Chemical	
Chemical Strength		50%	Dilution:		
ANSI/NSF Standard 60 Approval? (Y/N)		yes	NSF max dose:		mg/L
Normal Feed Rate/Dosage		85-95	mg/L		
Average Raw Concentration (mg/L)		pH 7.11	Average Feed Rate (mg/L)	93	
Avg Plant Tap Residual (mg/L)		pH 8.61			
Frequency of Testing	Raw:	1/4 hrs	Plant Tap:	1/4 hrs	
	Distribution:				
Analytical Method Used		pH probe	Instrument:		
Overfeed Protection	Adequate?		Anti-Siphon Device?		
Any Overfeed Instances? (Y/N)		no	Date(s):		
Any Low Feed Instances? (Y/N)		no	Date(s):		
Pump Type:		Metering	Model:	Milton-Roy	
Number of Pumps:		2			
Pump 1 Capacity	gpd max:	864	gpd	50	psi
Pump 2 Capacity	gpd max:	864	gpd	50	psi
Transfer pump for pumps 1 & 2	gpd max:	gravity			ft
Chemical Storage Bulk Tank		8263	gal		
Day Tank		525	gal		
Is a scale used to record chemical usage?		Ultra-sonic, grad scale	Manufacturer / Model:	Pulsar Ultra 90	
Calibration Procedure	see comment				
Calibration Frequency			Last Calibration Date:		

SAFETY

Separate Room	Yes	Extra Chemical Feed Pump or Parts	Yes
Exhaust fan	Yes	Shower/Eye Wash	Yes
Fresh Air Vent	No	Alarm	Yes
Door Opens Out With Panic Bar	Yes	Training Programs	Yes

Comments:

Volume of product used is determined from ultra-sonic level indication and/or graduated level read on the side of the day tank. The chemical feed rate is controlled by a calibration chamber.

The ultra-sonic devices are not calibrated. Each delivered load is checked with a manual calibration.

Ground Level Tank Storage

Construction, Controls & Maintenance				
Location	Denton Hill	Denton Hill		
SDWIS Facility ID (Site Code)				
Volume, MG	1.00	0.50		
Type	Ground Reservoir	Ground Reservoir		
Material				
O.F. Elevation				
Date Constructed	1959	1999		
Date Inspected	2014	2014		
Date Painted Inside	Concrete	Concrete		
Paint System	N/A	N/A		
NSF Std 61 Compliant (Y/N)				
Date Painted Outside	N/A	N/A		
Cathodic Protection	N/A	N/A		
Tank Isolation Valve	yes	yes		
Tank Drain (Hydrant)	yes	yes		
Altitude Valve				
Mud Valve				
High Alarm	Yes	Yes		
Low Alarm	Yes	Yes		
Alarms Received By				
Total Head Range (Feet)	20 ft	18 ft		
Normal High Water Level	15.53 ft	14.58 ft		
Normal Low Water level	10.6 ft	9.58 ft		
Normal/Average Pressure				
Data Recording System				
Control Signal Type	SCADA	SCADA		
Auxiliary Power for Controls?				
Control System Adequate?	yes	yes		
Vents Screened	yes	yes		
Overflow Screened	yes	yes		
Access Hatches Locked	yes	yes		
Expansion Collar Lubricated				
Mixing System				
Overflow Splash Pad				
Adequate Security?				
Operator Visit Frequency	1/month			
Comments:				

Capacity				
Usable Storage	0.94 mil. gal.	0.5 mil. gal.		
Total Usable Storage (MG)	0.94	0.50		
Total Usable Storage/Max Day	48%	26%		
Total Usable Storage/Avg. Day	86%	46%		

Comments:

The total usable storage is slightly less than actual construction due to a 14-inch elevation difference between both tanks. the larger tank is approximately 14 inches higher than the smaller tank, thus the top 60,000 gallons of the larger tank cannot be utilized. The combined storage volume is 1.44 MGAL which meets 74% of the 5-year maximum day demand and exceeds the average day demand.

Both tanks were inspected in June of 2014 by Utility Services. The exterior coating system for each tank was in fair condition and recoating was recommended. The roof hatch hinge on the 0.5 MGAL tank was broken and needs to be replaced. All remaining appurtenances were intact. A copy of the inspection report was provided to the DEQ.

Plant operators visit the tank site once a month during meter reads. Distribution operators do not have a set schedule for conducting tank site visits. Top access hatches are locked and an eight foot fence surrounds both tanks.

DEQ Conclusions/Recommendations:
Recoat each tank's exterior according to Utility Service's recommendations and complete repairs to roof hatch hinge Also, the ground storage tanks should be visited at least once a week. Tank appurtenances including overflows and vents should be checked as part of the weekly visits. Any signs of vandalism should also be checked.

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies?	No
If yes, list WSSN number (s):	
No. of Emergency Connections	none

Location	Main Size	Capacity	Metered?	Status (Regular/Emergency)	WSSN of Connection

Are valves exercised annually? _____

Flushed? _____

Comments:

Distribution Piping

Mains by Material	
Cast Iron	25%
Ductile Iron	65%
PVC	
Asbestos-Cement	10%
HDPE	
Galvanized	
Concrete	

Mains by Size	
2"	10%
4"	15%
6"	20%
8"	20%
10'	0%
12"	30%
14"	5%
16"	some

Mains by Age		
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	

Estimated percent of piping with coal tar lining 0 %

Comments:

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? Yes

Comments:

Still some areas, however much of the older piping in the south area of town have been replaced.

Are there areas where aesthetic water quality complaints are frequent? Few areas

If yes, identify locations: _____

Comments:

Softened water scoured out portions of the water system piping and caused short-term complaints. these complaints have been resolved with the institution of corrosion control treatment. There has been some increase in failure of residential hot water tanks. Some residents believe the previous corrosively shortened the useful service life of their water heater tanks.

Do you receive complaints alleging illness due to the water? No

If yes, identify locations: _____

Comments:

Are there areas where customers complain of low pressure? Yes

If yes, identify locations: Top of Denton Hill

Comments:

Residents in the Jane Hill Subdivision are subject to low pressure when the small booster pump station is not in service.

What is the procedure to respond to and track these complaints?

Comments:

Distribution System Capacity

Are there areas where peak flows (including fire flow) cannot be maintained? Few

If yes, identify locations: Any areas of limited fire protection will be updated in the next water system reliability study.

Comments:

Significant distribution system improvements were completed during two DWRF projects (late 1990s and again in the early 2000s). The above distribution system percent by pipe sizes does not reflect these most recent projects.

A third DWRF project was eligible for funding in 2006 and a construction permit was issued for the project which consisted of replacement of deficient mains in the northern portions of the city (Adelaide Street to North Road & several side streets). The project; however, did not proceed in 2006 as a result of higher than expected water rate increases associated with the cost of the water treatment plant and its operation. The city; however, acquired bonding through a separate source and completed the project in 2011.

At our request, the city is currently updating their water system Reliability Study. Flow testing to calibrate the hydraulic was being completed in May 2015. The R.S (draft report) is expected to be available later this summer (2015). The completed RS can be used in updating the water system General Plan by January 1, 2016.

Last ISO report date? 2006 Rating Class 4

Proposed distribution system improvements:

Location:	Estimated Completion Date
To be re-determined with revised RS.	

Comments:

DEQ Conclusions/Recommendations:
Complete the revisions to the water system Reliability Study (RS) and provide the DEQ a draft copy of the RS for review. The revised RS will need to include; 5 & 20-year demand projections, source water production totals, usage (residential/commercial/industrial), water shortage response plan, and recommended water system improvements. The recommended improvements can serve as the basis for establishing a new 5-year water system capital improvements program (a required element for water system General Plans by 2016).

DISTRIBUTION

Adelaide Street Pump Station

	Location:	East of Adelaide St & Manchester Dr near ground sto. tanks	
	Function:	Boost pressure to small subdivision	
	Adequate Security?	Yes	
Pump Number	1	2	
Year Installed			
Type	In-line HC	In-line HC	
Permit Capacity			
Permit TDH			
Current Capacity	200 gpm	200 gpm	
Current TDH	50 ft	50 ft	
Basis			
HP			
Last Complete Inspection			
Last Efficiency Test			
Control Signal Type			
Controls Adequate?			
Operator Visit Frequency			

Comments:

A small in-line booster pump station operates continuously to provide sufficient pressure to the Jane Hill Subdivision (approx. 55 homes) near the ground storage tanks. The station consists of 2 in-line booster pumps and is operated manually. One pump runs continuously. There is no telemetry to indicate pump status and plant personnel rely on low pressure complaints from residents in the subdivision to alert them of a pump failure. The station is not designed to provide fire protection and the primary pump was re-built by Layne-Northern in 2005.

Standby power and improved telemetry are being considered for this station.

AUXILIARY POWER

Power Type	none	Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)			MGD
Firm Pump Capacity (gpm)			MGD
Auxiliary Power Capacity (gpm)			MGD
Max Day Demand @ this location			MGD
Avg Day Demand @ this location			MGD
Firm Pump Capacity/Max Day			
Aux. Power Capacity/Avg Day			

Comments:

DEQ Conclusions and Recommendations:

Provide stand-by power and complete telemetry improvements for the pump station to improve the level of service to residents within the Jane Hill Subdivision.

DISTRIBUTION

Hydrants

Number of Hydrants	approx. 602	
Number Without Auxiliary Shut-Off Valves	6	
Number that are Self-Draining	approx. 10%	
Number of Inoperable Hydrants	fixed upon discovery	
Frequency of Hydrant inspection:	yearly or after a fire	
Inspection Staff:	Water Dept.	
Are there areas where additional hydrants are needed?	Some	
If yes, list locations:	A few additional hydrants are needed in the SE portion of the city	
Hydrant location system	Map, GIS	Accurate? Yes
Are hydrants color coded for capacity?	Yes	
Has this information been provided to the fire department?	Yes	
Frequency and seasons of hydrant flushing	1/yr per year	Fall
Purpose of flushing	Flush out iron deposits	
Is the public notified prior to flushing?	Yes	
Does flushing follow a specific format?	Yes	
Is the volume of water used during flushing estimated?	Yes	
Do hydrants receive maintenance painting?	yes	
Is a record maintained of hydrant activities?	Yes	

Hydrant records should include: Hydrant number, location of the hydrant, type of hydrant, size of barrel, size of bottom valve, size of lead, direction of turn, operable or inoperable, auxiliary valve type and size, weep holes plugged or unplugged, condition of hydrant (caps, chains, valve operation, operating nut, leakage & etc.), color coded capacity, flow data (gpm & psi) flushing dates, inspection dates.

Comments:

A GIS locating system has been established and the system is used for maintaining hydrant and valve information. Additional updates will be acquired as part of the updated RS.

Valves

Number of Valves	904	
Number of inoperable valves	varies	
Are there areas where additional valves are needed?	Yes	
If yes, list locations:	Older areas of the distribution system.	
Valve location system	GIS records	Accurate? Yes
Valve Turning Frequencies	Primary:	some valves operated
	Others:	sporadic
Records Maintained?		

Valve records should include: valve number, location of valve(with witness points), type of valve, size of valve, normal operating status (open or closed), condition of valve (operable or inoperable), direction of turn, number of turns, and dates of operation.

Comments:

DEQ Conclusions/Recommendations:
Establish a more comprehensive valve program. A valve program is a critical component of the distribution system and should consist of a schedule to exercise valves on a routine basis and maintain their records. A valve program reduces interruptions in service, reduced water loss, repairs, and less property damage.

The city has added valve location information to their GIS system and the work is over 90% complete; however, operation and maintenance records need to be completed. Some valves are turned during repairs or before a watermain project to verify proper operation; however, most valves should be turned on a routine basis. Any inoperable valves should be identified, repaired or replaced. Given the number of valves, we recommend that a segmented approach be taken (prioritizing valve turning by quadrants). This type of approach will allow most isolation valves to be turned over a four to five year period. Additional time and/or staffing may need to be dedicated towards establishing a full valve turning program.

DISTRIBUTION

Customer Service Information

Number of service connections	4,147
Number of metered service connections	4,147

Percentage of service line materials:	
Copper	84%
PVC/PE/PB	<1%
Galvanized	<15%
Lead	0%

Ownership of Service (CWS/Customer)	
From Corp Stop to Curb Stop	City
From Curb Stop to Property Line	N/A
From Property Line to Meter	Customer
Meter	City

CUSTOMER METERS

Types of meters Used	Sensus - Pos. Displ.
Number of Meters with Remote Reading Devices	4,147
Residential Meter Sizes	5/8, 3/4, 1"
Industrial/Commercial Meter Sizes	1-1/2 through 4"
Meter Testing/Maintenance Program	as needed
Average Age of Meter in System	wide variance
Criteria for Changeout	
Number or Percent Changeout per Year	5 to 10%
Master Meter Locations	Fenton Oaks MHP
Calibration of Master Meters	Not performed
Meter Reading Staff/Contract:	Water Dept.

Percent of Usage by Customer Type	
% Residential	80%
% Commercial	20%
% Industrial	<1%
% Other	

Large Users - % of Use	

Comments:
The percentage by users and large users will be updated during the RS. Upgrades to the metering system are being considered and include obtaining cost estimates for radio-read and changing out to the lead-free plastic meters. The city is also looking to switch from quarterly to monthly billing.

DEQ Conclusions and Recommendations:
Pursue full upgrade to a radio-read metering system. A full radio-read system will significantly reduce the time needed to conduct routine meter reads and allows water utility operators to focus on other O&M programs. Radio-read also provides the opportunity to improve customer service by providing timely notice to customers of high water usage (un-noticed leaks) before they cause potential problems.

System Growth

Year	# of Construction Permits Issued	Permitted Amount of WM Feet
2005	5	5,095
2006	3	18,456
2007	3	640
2008	1	wm repl
2009	1	541
2010	1	8,261 wm repl
2011	2	758
2012	0	0
2013	2	2,249
2014	2	1,899

Comments:
Residential and commercial growth slowed significantly between 2006 and 2008. Only a handful of new building starts occurred each year since 2009.

DISTRIBUTION

Water Rates		
What is your current rate schedule?	$ 5.25	/1000gals/qtr
Are current rates adequate to support O&M and CIPS?	Yes	
When was last time rates were adjusted?	2010	
Has a water rate study been performed? When?	Yes/March 2005	
Is there a meter charge or ready to serve charge?	Yes	
Is a copy of the water rate schedule and ordinance available?	Yes	

Comments:
Fenton's tap-in fee is $1,675 for a residential connection. The most recent increase in water rates was in 2010. The city plans to proceed with a water rate study in their next FY budget (7/1 - 6/30).

Repair Parts Inventory	
Extra Mains (Sections for Each Size in Service)	Yes - one for each
Repair Clamps (2 or more for each size)	Yes - two for each
Tees, Crosses & Elbows	Some
Hydrants	Few
Valves	Some
Services (Corp & Curb Stops, Clamps and Lines)	Yes
Other	

Comments:
Hydrants, valves, tees,crosses & elbows are available 24/7 from Michigan Pipe & Valve in Flushing, MI.

Safety Programs	
Confined Space Entry Program	Yes - 100%
Trench Safety Program	Yes

Comments:
Hydraulic shoring is used in dangerous situations.

PROGRAM COMPLIANCE

Cross Connection Programs

Ordinance No.	Div.2/Sec 33-31 to 33-37	Date:	1/22/2001		
Approved Program (Y/N)?	Yes	Date:	1/22/2001		
Staff Assigned to Program, (No., Dept and/or who)			Hydro-Design, Inc. (HDI)		
Is Annual Cross Connection report required (Y/N)?			Yes		
Was previous year's annual report received (Y/N)?			Yes	Date:	3/23/2015
Was previous year's annual report acceptable (Y/N)?			Yes		
Inspection Status:	On-going				
Assembly Testing Frequency	1/yr to 1/3yrs	High Hazard:	30	Low Hazard:	389
Assembly Testing Performance	>75% tested each yr				
Recordkeeping:					

Private Well Isolation/Abandonment Procedure:

Comments:

Cross connections were found at 4 accounts in 2014, follow-up is needed at 3 of these 4 accounts. Otherwise, Fenton has maintained an adequate CCCP through contractual services with HDI. HID continues to perform routine and follow-up inspections, maintains recordkeeping, and prepares the annual report. HDI maintains the city's objective of inspecting between 100 and 120 accounts per year and to test all testable devices. The city renewed their contract with HDI in 2013.

Annual Pumpage Reports

Is Annual Pumpage Report required (Y/N)?	Yes		
Was previous year's annual report received (Y/N)?	Yes	Date:	3/6/2015

Comments:

The APRs accurately depict water usage when comparing with the MORs.

Monthly Operator Reports

Are Monthly Operation Reports required (Y/N)?	Yes		
Were all previous year's reports received (Y/N)?	Yes	Timely?	Yes
Are previous year's reports acceptable (Y/N)?	see comment		

If no, describe problems:

Comments:

The MOR needs to report dosage of both phosphate compounds separately . Plant tap and distribution system phosphate concentrations also need to be monitored and reported on the MOR. Please reference the Sodium Hexametaphosphate page for further discussion.

Consumer Confidence Reports

Is the annual CCR required? (Y/N)	Yes		
Was the previous year's report received? (Y/N)	Yes	Date:	
Was the previous year's acceptable? (Y/N)	Yes		
Was the previous year's certification form received? (Y/N)	Yes	Date:	

Comments:

Emergency Response Plan

Date of ERP	11/1/2013	Acceptable?	Yes
Filed where?	Water Dept		

Comments:

DEQ Conclusions/Recommendations:

The ERP was reviewed and it meets our requirements. The ERP should be updated, as needed, once every several years.

PROGRAM COMPLIANCE

General Plan

Date of Most Recent Plan:	2008		
Filed Where?	Water Dept. & DEQ	Acceptable?	No
	General Layout	see comments	
	Facility locations & capacities	see comments	
	Water Main Inventory	see comments	
	Identification of Service Areas	see comments	
	Hydraulic Analysis	see comments	
	Capital Improvement Plan	see comments	

Comments:
The most recent water system General Plan (GP) prepared in 2008 needs to updated by January 1, 2016 and contain the elements listed above. The city is currently updating their water system RS. Many of components of the RS (hyd.analysis, watermain map, and recommended improvements) can be used for updating the GP.

Reliability Study

Date of Most Recent Study:	2005 DWRF Project Plans	Next Due:	Due
Filed Where?	MDEQ	Acceptable?	yes
Contents:	5 & 20 Year Demand Projections	see comments	
	Source Production Totals (Monthly)	see comments	
	Customer Supply Usage (Annual)	see comments	
	Res/Comm/Ind Usage (Annual)	see comments	
	Water Shortage Response Plan	see comments	
	Recommended Improvements	see comments	

Comments:
Fenton's DWRF 2005 project plan identified system needs and projected future demands and growth through 2025 and some of these improvements have been completed. The city's RS is being updated and a draft copy of the study is expected to be available for review and comment later this summer (2015).

Permits

Applies for and obtains permits prior to construction (Y/N):	yes	
Reviews plans prior to submittal to DEQ (Y/N):	yes	
Standard specifications on file at CWS (Y/N):		Date:
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):		
Follows master plan for any construction (Y/N):		
Develops as-built plans (Y/N):		
Updates general plans (Y/N):		

DEQ Conclusions and Recommendations:
Fenton's most recent water system General Plan (GP) needs to be updated to include water distribution system improvements completed through 2015. The revised GP must also include the following elements by January 1, 2016 in accordance to revisions in the Michigan Safe Drinking Water Act's rules.

• General layout of the entire waterworks system, including distribution system piping and the location of valves, hydrants, storage tanks, and master meter connections.

• Hydraulic analysis of the distribution system showing pressure contours under peak demands and inventory of watermain by size, material, and age. The hydraulic model used in the RS can be used for the GP provided that the model is updated to reflect most recent water distribution system improvements.

• Service area map including existing and future service area boundaries.

• Water system Capital Improvement Program (WSCIP) for the 5-year and 20-year planning periods. The WSCIP should be based upon the recommended improvements in the RS.

Since both the RS and GP are to be completed within a short timeframe of each other and that they contain overlapping elements, it may be worthwhile complete them concurrently. Reference Appendix C for RS and GP requirements.

MONITORING

Bacteriological

Date of Approved Site Sampling Plan:	Jan 2010		
Number of samples required each month:	10	Basis:	pop
Certified Lab Used:	Fenton WTP		
MCL, Monitoring or Reporting Violation(s) in past 3 years? (Y/N)	None	Date:	
Number & Type of Violations		NA	
Public Notice Issued according to regulations? (Y/N)	NA	Date:	

Comments:
The city uses their certified laboratory for total coliform analysis in drinking water.

DEQ Conclusions and Recommendations:
Update the most recent Bacteriological Sampling Site Plan to reflect changes in system contacts - local & DEQ

Chemical

Date of Monitoring Schedule:	2015 - See Appendix B		
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)	yes		
If nitrate detect, what is concentration?	none	Date:	
If nitrite detect, what is concentration?	none	Date:	
Detects for metals > 50% of MCL? (Y/N)			
Metals (list)	none	Date:	
		Date:	
Detects for VOCs (Y/N)	none	Date:	
Detects for SOCs (Y/N)	none	Date:	
Date of Approved Disinfection Byproduct Monitoring Plan:	Dec 2013		

Comments:

Lead and Copper Monitoring

No. of Samples Required:	20		
Frequency (Semi Annual/Annual/Triennial)	Triennial		
Exceedance of lead or copper action level (Y/N)	no		
If yes, was public education issued? (Y/N)	na	Date:	
Next Monitoring Period:	2017		
Corrosion Control Program Status, if applicable	add PO4		
Lead service line replacement status, if applicable	na		

Comments:
The city has remained in compliance with Pb/Cu regulations and has met both action levels in all applicable rounds. Triennial monitoring is in effect and the next round of samples (20 samples are due for collection from the distribution system between June 1 and September 30, 2017.

Radiological Monitoring

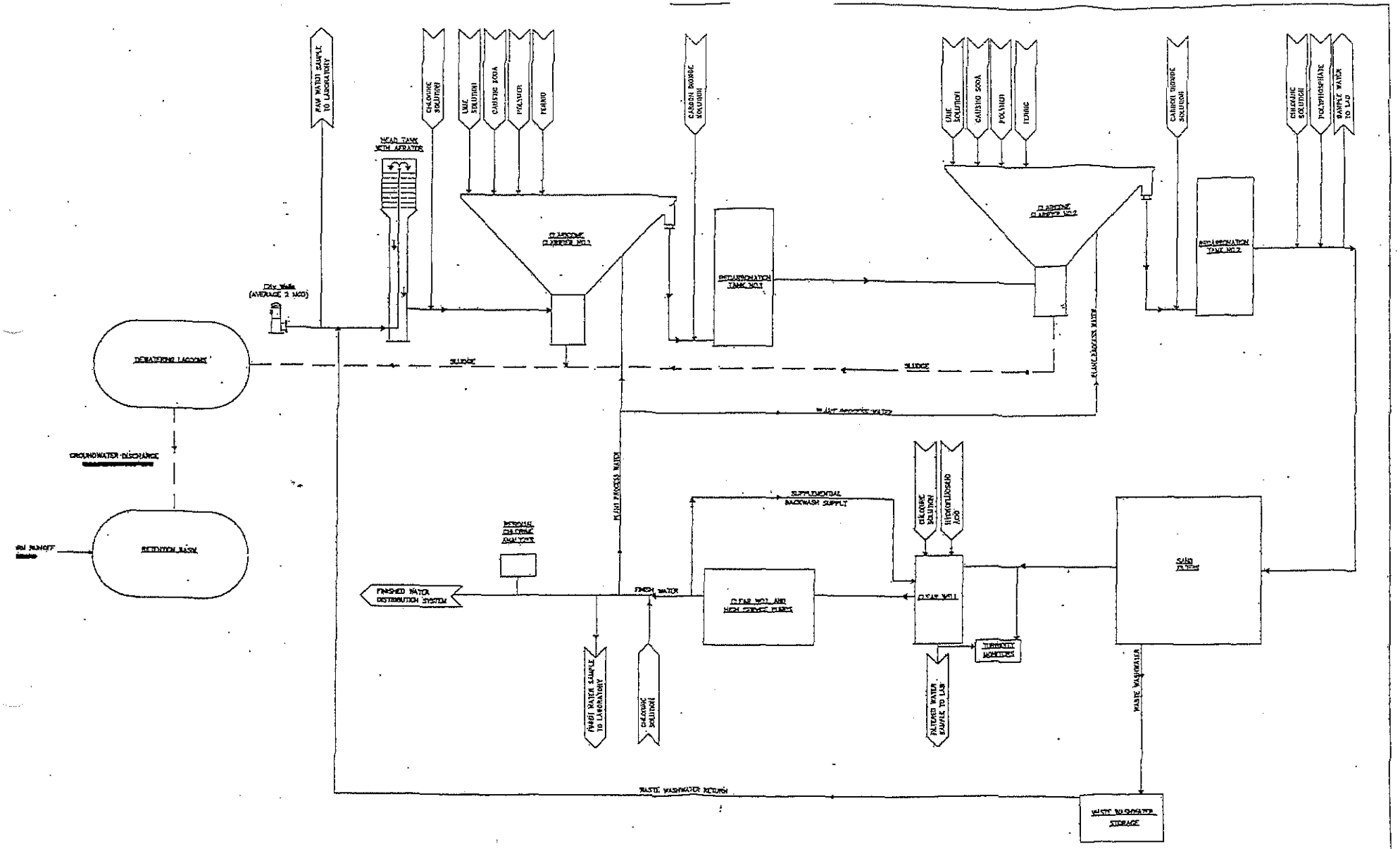
Gross Alpha		Date:	
Combined Radium (226+228)	1.58 pCI/L	Date:	9/18/2013
Beta, Uranium		Date:	
Radon		Date:	
Tritium		Date:	
Detects for Rads > 50% of MCL? (Y/N)	no		
If yes, list		Date:	

Comments:

Appendices

Appendix A

Plant Flow Diagram and System Map



CITY OF FENTON
WATER TREATMENT PLANT

GROUNDWATER DISCHAGE PERMIT APPLICATION
WATER USAGE DIAGRAAM

Ayres, Lewis, Norris & May, Inc.
Engineers - Planners - Surveyors
Water Resource Park Drive
Ann Arbor, Michigan 48108
(734) 761-1052 FAX (734) 761-1066

182466-02

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Appendix B

2015 Monitoring Schedule

2015 Monitoring Schedule

FENTON, CITY OF

WSSN: 02270

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.					
	1/12 months	**09/30/2015**	TP001	$18.00	32	R
Volatile Organic Compounds	1/36 months	**09/30/2015**	TP001	$100.00	36VO	CXVO
Complete Metals	1/108 months	09/30/2021	TP001	$102.00	36ME	CMET2
Arsenic	1/3 months	**Quarterly**	TP001	$18.00	36ME	CAS
Cyanide	1/36 months	**09/30/2015**	TP001	$25.00	36CNa	CCN
SOC – Pesticides	1/36 months	**09/30/2015**	TP001	$125.00	36PT	CXPT
SOC – Herbicides	1/36 months	**09/30/2015**	TP001	$120.00	36HB	CXHB
SOC – Carbamates	1/36 months	**09/30/2015**	TP001	$120.00	36LP	CXLP
Gross Alpha (Radiological)	1/108 months	09/30/2016	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	1/72 months	09/30/2019	TP001			

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	10/Monthly	**Monthly**	DIST	$16.00	30	BPTC
Chlorine Residual	DBP Monitoring Plan	If serving chlorinated water, 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.					
Total Trihalomethanes	DBP Monitoring Plan	2/12 months	**During July 2015**	See DBP Monitoring Plan	$65.00	36VO	CXTM
Haloacetic Acids		2/12 months	**During July 2015**	See DBP Monitoring Plan	$130.00	36HA	CXHA
Lead Copper for Corrosion Control	Lead and Copper Sampling Pool	20/36 months	Between 06/01 and 9/30/2017	DIST	$26.00	36CC	CCUB

Appendix C

General Plan & Reliability Study Requirements

PART 16 – GENERAL PLAN

Highpoints

1. The general plan will need to be updated when the department determines the plan is inadequate or outdated.
2. Updated general plan will need to include the following:
    a. General layout of the entire waterworks system, including treatment systems and distribution systems, and the location of valves, hydrants, storage tanks, watermains, pumps, wells, and pumping facilities.
    b. Rated capacity of the waterworks system, including capacity of the developed water source, treatment system, storage tanks, pumping facilities, and equipment to maintain system reliability.
3. PWS that provide fire protection will have to include with the following information:
    a. A hydraulic analysis of the distribution system showing pressure contours under peak demands.
    b. An inventory of water main by size and material and age.
    c. Service area maps including existing and future service area boundaries.
4. Existing PWS will be required to provide a capital improvement plan for 5-year and 20-year planning periods beginning in January 1, 2016.

Significant water system improvements or the need too may require a hydraulic or computer model of the water distribution system. The hydraulic modeling and report should address the following items:

a. Provide a network analysis map showing the pipe number, junction nodes, and include a pipe and junction report. Pipe report should include pipe size, material, length of pipe, and roughness coefficient.
b. Have the hydraulic model calibrated by comparing field results to computer simulated results. A table should be included in the study comparing field and computer simulated pressure and fire flow measurements. AWWA guidance suggests that hydraulic models intended to be used for long term planning should be accurate within 5 psi, but more accuracy may be necessary for other modeling applications.
c. Have the hydraulic analysis evaluate the static and residual pressure in the water distribution system for present and future average and maximum day demand conditions.
d. Have the hydraulic analysis evaluate the fire flow capacity of the water distribution system under maximum day demand and with the water distribution system pressure held at 20 psi.
e. Have the hydraulic analysis evaluate pressure and fire flow for the recommended proposed improvements to the water distribution system.
f. Provide pressure and fire flow contour maps with the report. The Water Bureau may request a junction report and pipe report to supplement the pressure and fire flow contour map.

PART 12 - RELIABILITY

A study to determine the quantity of water needed for the waterworks system based on 5-year and 20-year projections of water use. The study is required to be updated every 5 years unless the owner demonstrates water use projections are stable and this requirement is waived by the department.

Highpoints

1. Basic planning data (current population, number of service connections, equivalent residential units).
2. Sufficient water production and consumption data to identify trends for both 5-year and 20-year planning periods. This will include the following elements:
    a. The present and projected average daily, maximum daily, and maximum hourly demands.
    b. The present and projected peak instantaneous demand for systems using hydropneumatic storage.
    c. The present and projected fire flow demand.
    d. The basis of demand projections.
    e. Monthly and annual production totals for each source, including water purchased from another public water supply.
    f. Annual usage totals for water supplied to other public water supplies.
    g. Annual usage totals for each customer class as determined by the public water supply.
3. A water shortage response plan for emergencies.

Additional Study Considerations

The basis of present demands and projections shall consider, among others, the following factors:

a. The population growth in the total projected area to be served and the population density in unit areas.
b. The extension of the system into new areas.
c. The type of industrial and commercial customers and their patterns of use.
d. The sprinkling and irrigation use, and pattern of use.
e. The fire demand to meet the requirements of the Michigan Insurance Service
f. Office or other recognized fire rating service.
g. Water use for cooling in industrial use and air-conditioning.
h. Unaccounted water use.
i. Recorded distribution system pressure readings.
j. Metering of the water system.
k. Potential for emergency or permanent interconnections with other adjacent systems.
l. Water use agreement between the water system supplier and water system retailer or wholesaler.
m. Water use restriction authorized by ordinances.
n. Demand projections in individual pressure districts.

2270

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 24, 2012

Mr. Dan Czarnecki, Public Works Director
City of Fenton
301 South Leroy Street
Fenton, Michigan 48430

Dear Mr. Czarnecki:

SUBJECT: 2012 Sanitary Survey; City of Fenton Water System

Enclosed is a copy of the City of Fenton Municipal 2012 Water System Review (WSR) completed by this department. This report is being submitted for your review, comment, and action.

Based on the findings from the 2012 WSR, the City of Fenton shall maintain a **"Satisfactory"** water system rating. There are several items of concern that need attention and are discussed in the survey.

Your attention should be directed to pages 32 through 36, which details our observations, conclusions, and recommendations. In addition, pages 36 and 37 provide a brief summary of the individual items that need to be addressed and references the pages in the report where those items are discussed.

Item #1 discusses the need to proceed with the work recommended on Well #5, perform routine pump/motor maintenance on Well #6, and plan for chemical cleaning of Well #8.

Item #2 acknowledges the city's intention to install process water metering at the water treatment plant (WTP). The city is also encouraged to eliminate any remaining unmetered customers.

Item #3 discusses the need to install remaining security fencing and cameras at the WTP.

Item #4 discusses the need to provide lightning surge protection at the WTP.

Item #5 encourages WTP operators to maintain and expand their ongoing filter maintenance program.

Item #6 recommends inspection of the WTP's clearwell within the next 3 to 5 years.

Item #7 discusses the need to inspect both ground storage tanks and provide us with a copy of the inspection report..

Item #8 calls for revision of the 2005 water system Reliability Study.

Item #9 recommends further establishment of the distribution system valve turning program.

Item #10 discusses the need to prepare a water system Emergency Response Plan.

The items vary in priority and are listed without ranking.

We wish to thank your staff for their time and assistance given during the survey and preparation of the report. We will be contacting you to arrange a time to meet and discuss the contents of this report.

Should you require further information, please contact me at the telephone number below; via e-mail at prysbym@michigan.gov; or Department of Environmental Quality, P.O. Box 30242, Lansing, Michigan 48909.

Sincerely,

Michael Prysby

Michael F. Prysby, P.E.
District Engineer
Resource Management Division
Lansing District Office
(517) 335-6122

mfp:jlr
Enclosures

cc: Mr. Stephen Guy, Water Plant Superintendent
Mr. Donald Fralick, Water Distribution Superintendent

2270

The City of Fenton Water Treatment Plant & Distribution System Sanitary Survey

Report By:

Michigan Department of Environmental Quality

Michael F. Prysby, P.E., District Engineer

April 2012

Acknowledgments

The Michigan Department of Environmental Quality wishes to thank those involved in putting this survey together. A special thank-you goes to the City of Fenton, especially water plant superintendent, Stephen Guy, for his time and patience in compiling the requested data.

FENTON WATER SYSTEM
SANITARY SURVEY

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SANITARY SURVEY
EVALUATION FORM

BASIC DATA

Name of Supply: City of Fenton Review Dates: 3/14/2012
4/4/2012

WSSN: 2270 Reviewed By: Michael F. Prysby

Mailing Address:
301 South Leroy Street
Fenton, Michigan 48430

Plant Address
15300 North Road
Fenton, Michigan 48430

City Officials
Mayor: Sue Osborne
City Manager: Lynn Markland
Public Works Director: Dan Czarnecki
Water Plant Superintendent: Stephen D. Guy
Operator-In-Charge (OIC): Stephen D. Guy
Back-up operator: Robert Stuker

Water Treatment Plant Operators:	Licenses
Stephen Guy	F-1
Robert Stuker	F-2, S-2
Geoffray Feit	F-3, S-3, D-5
[illegible]d K. McKeen	F-3, S-1
James Brayak	F-4

Distribution System Superintendent: Daniel Czarnecki S-1

Retail Customers: None

Wholesale Customers: None

Total Population Served: 11,746 - 2010 Census

Percent Metered: 100%
Percent Unaccounted: 26 - 28%, Approx 5% of unacct water used is attributed to WTP process water. Process water metering will be installed. Several unmetered buildings in the downtown area also comprise for unaccounted water.

WTP winter operation is carried out in two 10-hour shifts (6am-4pm and 10am-8pm). Two shift operators in addition to the OIC are present between 10am and 4pm.

WTP summer operation is carried out in two 10-hour shifts (6am-4pm and 2pm-12am). Two shift operators in addition to the OIC are present between 2pm and 4pm.

Current WTP staffing level (4 shift operators plus the OIC) appears to meet the operational needs of the treatment plant.

Water System Construction Features & Dates:

1. The Fenton iron removal treatment plant was constructed in 1959 and placed into service in 1960.

2. Wells #5, #6, and #7 were constructed in 1960.

3. Mid 1990s - Iron removal plant improvements including chlorine room modifications and yard piping improvements were completed.

4. Late 1990s - An additional 0.5 MGAL ground storage tank is constructed at the top of Denton Hill.

5. 2000-2005 - A new 4.0 MGD lime-soda softening plant is constructed and the old iron removal plant is razed. A fourth well (Well #8) with a capacity of 1,250 GPM is constructed.

Vulnerability Assessment Status:
Emergency Response Plan (ERP) Status:

Security measures: Intrusion alarms are provided at each wellhouse and each door has a dead-bolt lock. The WTP is fenced except for the front. Motion detectors are installed in all rooms with a dialer that notifies the water plant OIC. The ground storage tank site is fenced and motion sensors are provided. Alarm conditions are sent to the WTP OIC via alarm dialer. Federal funding for security cameras at the WTP has not been allocated thus far.

TABLE 1. Production Data (Million Gallons)

Production Data (Million Gallons)	2007	2008	2009	2010	2011
Maximum Daily Demand:	2.24	1.89	1.49	1.65	1.73
Average Day for Maximum Month:	1.91	1.42	1.35	1.4	1.51
Average Day Demand for Year:	1.27	1.15	1.11	1.07	1.07
Minimum Day Demand	0.82	0.85	0.77	0.8	0.71
Average Per Capita Consumption: (gpd)	105.7	96	95	91	89

WATER TREATMENT PLANT

Treatment Objectives: (See Table 2)

Plant Design Capacity: 4.0 MGD (the plant has the capability to be expanded to 5.0 MGD based on the
State Rated Capacity: 4.0 MGD hydraulic capacity of the clarifiers and the internal piping)

Plant Metering	Y/N	Type
Raw Water:	Y	Mag meter
Finished Water:	Y	Mag meter
Backwash Water:	N - determined by flow rate	
Plant Water:	N - Mag meter to be installed this summer	
Sludge Discharge	Y - new mag meter	

A new mag meter was installed on the combined discharge line from both clarifiers to the sludge lagoon in order to determine the volume of discharge being sent to the sludge lagoon.

Total Treated Water Storage	1.63 MG
Treatment Plant	
Clearwell:	0.13 MG
Distribution System	
Elevated Storage:	None
Ground Storage:	1.50 MG
Total (MG)	1.63 MG
Percent of Maximum Day:	approx 85% - 90% of MDD since 2008

Demand/Capacity/Storage Comments:

Max day demands continue to decrease and currently range between 1.5 and 1.9 MGD.

Fenton has a 1.0 MG and 0.5 MG ground storage tank at the top of Denton Hill. The elevation of Denton Hill allows these tanks to function as an elevated storage tank. The overflow elevation of each tank differs by approximately 14-inches which does not allow the top 60,000 gallons of the 1.0 MG tank to be used.

TABLE 2. WATER QUALITY

	Raw		Treated	
	Normal	Range	Objective	Range
Hardness, ppm	530	505-555	150	140-160
Turbidity, NTU	0.5	0.48-0.53	0.05	0.04-0.07
Color	NA			
Alkalinity, ppm	330	310-350	75	70-80
Total Col, cts/100 ml	NA			
TOC, ppm	NA			
Nitrate, ppm			0	0
Fluoride, ppm	0.25	0.22-0.27	1.00	0.95.1.05
TTHM, ppb			0.015	0..01-0.02
HAA5, ppb			0.002	0.0025 R
pH	7.15	7.05-7.30	8.6	8.5-8.7

WELL DETAILS:	Well 5	Well 6	Well 7	Well 8
well status:	Op.	Op.	Op.	Op.
tr[illegible]tment:	None	None	None	None
y[illegible] installed:	Yr 1960	Yr 1960	Yr 1960	Yr 2003
total depth:	74 ft	90 ft	92 ft	100 ft
casing diameter:	16-in	34-in	34-in	16-in
static water level:				31 ft
pumping water level:	50 ft	65 ft	65 ft	71 ft
pump type	VT	VT	VT	VT
current capacity	330 GPM	1120 gpm	1120 gpm	1000 gpm
HP	20 HP	20 HP	30 HP	100 HP
Last pulled for insp.	Yr 2000	Yr 2002	Yr 2009	Yr 2009
Well seal	Yes	Yes	Yes	Yes
Casing 12" above gr	Yes	Yes	Yes	Yes
Pump/waste piping	Yes	Yes	Yes	Yes
screened/capped?	No	Capped	Capped	Capped
Air/Vac relief	Yes	No	No	Yes
screened?	No	NA	NA	No
Casing Vent	Yes	Yes	Yes	Yes
screened?	Yes	Yes	Yes	Yes
Check valve	Yes	Yes	Yes	Yes
Meter	At WTP	At WTP	At WTP	Yes
Raw tap	Yes	Yes	Yes	Yes
Chem tap	At WTP	At WTP	At WTP	At WTP
P[illegible]nt tap	NA	NA	NA	NA
C[illegible]m feed outlet	No	No	No	No
Heater	Ele.	Ele.	Ele.	Ele.
Water level device	Yes	Yes	Yes	Yes
Pressure gauge	Yes	Yes	Yes	Yes
Floor drain	Yes	Yes	Yes	Yes
Door opens out	Yes	Yes	Yes	Yes

WELL COMMENTS:

Well #5 This well periodically broke suction between 2000 and 2005. This has not been a problem since 2005; however, the capacity of the well remains compromised. Peerless-Midwest has recommended chemical cleaning and installation of a VFD to control pump output and to limit capacity of approximately 300 gpm. The work is expected to proceed later in 2012.

Well #6 & Well #7 Each wellhouse has been refurbished and includes replacement of the roofs. The pump and motor in Well #7 was pulled and overhauled in 2009. A visual TV inspection of the well was also performed and the well was found to be in good condition. New drop pipe was also installed. Well #6 is due for routine pump and motor maintenance.

Well #8 This well was constructed in 2003 along with the new WTP. The wellhouse is relatively new and in good condition. The pump and motor was pulled in 2009 for routine maintenance. A visual TV inspection also confirmed that this well has remained in good condition; however, the well is losing specific capacity. Chemical cleaning is recommended within several years.

OVERALL WELL COMMENTS:

The city has authorized a consultant to investigate several potential well sites with the objective of constructing a new well with less non-carbonate hardness; thus, lowering the overall treatment cost.

Copies of the well efficiency reports for Wells #5,6,7, and 8 are available at the WTP.

The city has acquired an approved Wellhead Protection Program.

The city utilizes Peer-Less Midwest to perform annual maintenance on all 4 production wells which includes yearly pump performance tests.

AUXILIARY POWER:

Facility:	WTP & Well #5	Wells 6,7,&8
Power type:	Generator	Generator
Fuel type:	Natural gas	Natural Gas
Capacity:	500 kw	185 kw
HP:		
Starting freq:	weekly	monthly
Load testing freq:	1/yr	1/yr

STAND-BY POWER COMMENTS:

The new WTP and Well #8 included two new stand-by power generators. Stand-by power can also be provided to Wells #6 and #7 from the stand-by power generator at Well #8. Bridgeway Power performs yearly maintenance for the stand-by power generators.

Pumps and Pump Locations

Purpose	Location	Capacity	Type	Lubricant	Status	
Low Service:						
1	Well #5	330 GPM	VT	oil - top	Op.	
2	Well #6	1120 GPM	VT	bearings	Op.	
3	Well #7	1120 GPM	VT	grease -	Op.	
4	Well #8	1000 GPM	VT	bottom bearings	Op.	
FIRM CAPACITY:	**2450 GPM**					
High Service:						
#1	Top of clearwell	1200 GPM	VT	same as low	Op.	
#2	Top of clearwell	1200 GPM	VT	service	Op.	
#3	Top of clearwell	1200 GPM	VT		Op.	
#4	Top of clearwell	1200 GPM	VT		Op.	
Firm		**3600 GPM**				
2 Clarifier Re-Circul:	Cone floor	700 GPM	HC		Op.	No
1 Clarifier Drain:	Cone floor	400 GPM	HC		Op.	No
2 Waste Wash Water	WTP Sublevel	500 GPM	Sub		Op.	NA

Reclaim: Yes - The wasted washwater from filter backwashing is temporarily stored in the waste washwater storage tank. This water is pumped back to the plant influent via the waste wash water pumps. The 70,000 gallon washwater storage tank can hold 2 backwash volumes. The tank also has an overflow to a storm water catch basin.

Sludge Disposal: 2-celled sludge lagoon

Sludge produced during clarification is sent by gravity to the sludge lagoon. Both clarifiers can can also utilize the 400 GPM clarifier drain pump, if needed, to pump sludge to the sludge lagoon. The sludge pumps are occasionally used, however, transport of sludge to the lagoon is performed mostly by gravity.

The city removed lime sludge from their sludge lagoons in 2010. The excess sludge is disposed off-site for agricultural use and the work was completed in accordance to WHMD's requirements for off-site disposal. A copy of the requirements and the approval is in Appendix A.

Discharge of treatment plant sludge to the sludge lagoon is performed under the provisions of the groundwater discharge permit GW1010298 issued in January 2011. The WTP has maintained compliance with the current groundwater discharge permit. The most recent permit allows a maximum volume discharge of 22,000 GPD with volume based on 40% of metering flow and 60% being solids. The new permit also allows for a maximum 100,000 gpd discharge for clean-out operation. GW1010298 will expire on February 1, 2013. A copy of the groundwater discharge permit is in Appendix B.

L .tion of Pump Switch Gear: Rear of WTP

Filter Backwash:
There is no filter backwash pump. The filter backwash source is from the remaining three filters in service via gravity with supplemental supply from the high service discharge (distribution assist). The filter backwash is initiated by increasing the height of a movable weir on the clearwell influent, thus directing the remaining in-serviced filtered water for backwashing. Backwashing through the supplemental supply has not been used.

Pumping Comments: The WTP has four high service pumps. A lightning strike in July 2011 took 3 of the 4 pumps out of service. The pump drivers had to be replaced and the pumps were placed back into service. Full lightning surge protection needs to be provided to prevent this problem from recurring.

The clarifier recycle pump is used to induce rotation within each claricone during start-up. These pumps use water from the recarbonation tanks for start-up.

The high service pumps are located above the clearwell and are not subject to flooding. The clarifier re-circ. pumps and clarifier drain pumps are located in the WTP sublevel adjacent to the claricones and would be subject to flooding in the event of a significant pipe failure.

Pump Controls: The high service pumps are controlled by the SCADA control system. Pump operation is established by the water level in the ground storage tanks at the top of Denton Hill. These pumps can be manually operated. Each pump has a soft start drive.

Discharge Operation: Daily WTP operation requires discharge of the sludge blanket (approximate duration of 2-4 minutes per clarifier at 800 GPM). The groundwater discharge permit was modified to allow 100,000 gallons to be discharged during a clarifier clean-out event. The maximum yearly total flow was increased from 5.5 million gallons to 8.33 million gallons.

TREATMENT FACILITIES

AERATION:

Type: Splash aerator with head tank

Purpose: Reduce raw water CO2 to decrease chemical usage. Oxidation of iron and arsenic.

Trays: 4 trays - each tray is 8.5 feet in diameter

Design Capacity: .16.3 gpm/sqft

COMMENTS:
Tray aeration at an application rate of 16.3 gpm/sqft is provided. The aerator is comprised of 4 trays with screened intakes. The aerator can be by-passed if necessary. WTP staff inspect the condition of the aerators including the integrity of the air-intake screens 1-2 times per year. All of the corroded air intake screens have been replaced.

WTP staff extended the chlorine feed line immediately upstream of the raw water meter and the aerator. This has reduced scaling within the aerator.

LIME FEED SYSTEM:

Type: Volumetric screw feeder to solution tank

Number of Units: Two

Capacity: 2000 pounds/day each

Storage: Two 35-ton bins are provided. One full bin provides approx. 30 days of storage during winter operation. During summer operation, both bins are used and provide approx. 45 days of storage. Each feeder converts hydrated lime to a lime slurry and the slurry is transferred to a 500 gallon lime slurry tank. Each slurry tank is equipped with a turbine mixer and has a radar level monitor with high level alarm.

Type of Lime: Hydrated lime - Supplier: Carmeuse Lime

Feed Point: Mixing chamber at each claricone influent

Calibration: Each lime feeder is equipped with a lime slurry pump. Each pump is controlled by a VFD with a maximum rate of 15 GPM each. Each pump pumps lime slurry from its representive lime slurry tank to the lime application point. Each pump is currently set to operate at 14 GPM.

WTP staff obtained assistance from a consultant, Chemco, on establishing optimal lime feed rates. This assistance has helped to achieve a more consistent finished water hardness.

The discharge lines from each lime slurry tank are cleaned and flushed on a daily basis. Each tank is dismantled and cleaned thoroughly once every 6 to 8 months.

SOLIDS CONTACT UPFLOW CLARIFIERS

Unit Make: CBI - Walker "All-Cone Claricones"

Number of Units: 2

Volume of each unit: 54 FT top diameter, 10 FT bottom diameter - 175,000 gallons each

Design Capacity: 2,778 GPM each - 4.0 MGD (series operation)

Upflow Rate: 1.28 gpm/sqft maximum

Detention Time at rated capacity: 52 minutes at design rate. Based on current operation, the detention times are approximately 90 minutes in each clarifier or 3 hours total.

Mixing: Lime slurry is applied in the center of the mixing chamber. Rapid mix is hydraulically induced within the mixing chamber. Raw water enters the bottom of mixing chamber and is mixed with applied lime followed by clarification.

Condition of equipment: All equipment was installed in 2003 and is in good condition.

Chemicals added: Lime slurry, caustic soda, anionic polymer, and chlorine

Inlet Design: 16-inch line to first unit, 20-inch to second unit - Piping is configured to allow operation of both units in series or in parallel.

Outlet Design: Each cone has one effluent launder that spans from the center to the outer edge. The The launder is adjustable from the center of the cone 6-inches up or down. There are no V-notches in the launder. Instead, an adjustable plate is provided.

Baffling Factor: poor - 0.1

Overflow: Yes - overflow leads to the waste washwater storage tank.

Drains: One 6-inch sludge drain line to sludge lagoon

Curbing: 4-inch curbing with aluminum grating walkway, 4-inch kick plates, and 1 1/2 -inch handrails are provided.

Sludge Disposal: One centrifugal pump rated at 400 GPM @ 20 FT TDH is available to pump lime sludge from each clarifier to the sludge lagoon located behind the WTP. The lime sludge is typically discharged by gravity due the high water content and pressure head from the claricone. The pumps are used on the last part of the drawdown as the solids content increases and the driving head decreases.

Physical Condition: New in 2003

Effluent turbidities range between 0.3 and 0.7 NTUs.

Maintenance: The maximum daily discharge limit (22,000 gal) and the 100,000 gpd for drawdown events will shorten the time needed to complete routine maintenance on the clarifiers. This will also reduce, or eliminate, the time needed to operate the WTP in single stage while one clarifier is down for maintenance.

Operation: The clarifiers are currently operated in a split treatment mode.
(appr 89% - 11% split flow - winter & 85% - 15% split flow in summer)

RE-CARBONATION

Storage: One 14-ton CO2 tank (approx. 70 days of CO2 storage)

Contact Chamber: One 4,550 gallon CO2 contact standpipe downstream of each claricone.
Each contact chamber is 5 ft in diameter and 31 feet high
Due to split treatment, only the second contact chamber is in operation.

Feeder: Two Tomco feeders each rated at 42 lbs/hr.

Comments: A pressurized solution feed system is utilized for re-carbonation. The system injects CO2 into the solids contact effluent piping. 60-90 seconds of contact time is provided via a recarbonation standpipe following each solids contact unit. Continental Carbonic is the chemical supplier.

FILTRATION

Type of filter: Mixed media filter

Number and Area of Filters: Four filters each with 256 sqft of surface area (16 ft L X 16 ft W)

Design Filtration Rate, 2.71 gpm/sqft.

Approved Filtration Rate, 3.62 gpm/sqft.

Nominal Rate, 0.78 gpm/sqft. (based on an average day of 1.15 mgd)

Maximum filtration rate, 1.80 gpm/sqft.

Flow Equalization: Flow is equalized through all four filters by use of flow meter

Rate of flow device: None

Filter to waste available? Yes - Four 10-inch valves

Filter hours: Average: 60-80 hrs Maximum: 80 hrs Minimum: 60 hrs

Filter Media - Filters No. 1-4

	Anthracite	Sand
Depth - inches	18-in	12-in
Effective size	1.0 -1.22 mm	0.45 - 0.55 mm
Uniformity coefficient	<1.5	<1.6
Specific gravity	1.62	2.65

Date Last Rebuilt or Checked: The filter boxes were repainted due to poor workmanship with the original painting. Boxes 1 and 3 were repainted in 2006 and boxes 2 and 4 were repainted in 2007. T' ~ project required removal of all the filter media to a temporary storage location.

Underdrain Type: False bottom above true bottom with ABS plastic media retaining nozzles

Curbing: 4-inch kick plate with 42-inch handrail.

Filter Overflow: A 16-inch line to the waste washwater tank is provided.

Surface Wash: Not provided - A combination of air-water backwash is provided.

Depth of Water Above Media: Approximately 81-inches

Filter Performance Records: Filter run times and turbidities are monitored and reported on the monthly operation report. Time/turbidity graphs are compiled and the information is stored in the WTP's SCADA system.

Turbidimeters: The WTP has continuous turbidity monitoring for each filter and filter confluence. Grab samples are taken for applied water turbidity monitoring. All turbidimeters are calibrated once every 6 months.

Turbidity monitoring is performed at the following locations:

1. 'ncoming raw water prior to lime feed.
2. pplied water
3. Individual filter effluent
4. Plant Tap - Filter confluence

COMMENTS:
The filter media was re-installed In 2006 - 2007 and the media was noted to be in good condition. Filter core samples were recently collected by WTP staff and sent to Utility Services for analysis. The findings of the analysis will be provided to us.

Backwash:

Average run length time of filter: 60-80 hours

Criteria for backwash: Length of filter run - every 4th day of operation and not to exceed 120 hours, filter effluent turbidity not to exceed 0.45 NTUs, maximum head-loss not to exceed 12.0 ft based on filter recommendations.

Source of backwash water: Up to 2778 GPM from in service filters plus supplemental supply from high service pump discharge (supplemental supply not used).

Average duration of backwash 10-15 minutes

M 'mum duration of backwash: 20 minutes

Backwash flow: Based upon weir height - range is from 8-15 GPM/SQFT using combined air-water backwash

Maximum backwash flow: Up to 3840 GPM based upon 15 GPM/SQFT

M imum backwash rate: 15 gpm/sq.ft design rate

Backwash water disposal: Backwash water is sent to a 70,000 gallon waste washwater tank for temporary storage prior to being re-circulated to the solids contact treatment unit.

Is bed expansion achieved? Yes

Is there loss of media during backwash? Trace amounts of media are noticed consisting mostly of fines and flats.

Backwash disposal

Is backwash water recycled? Yes, backwash water is re-cycled at the raw water influent just inside the WTP building. Treatment equalization is not provided prior to re-cycling. Approximately 11,000 - 15,000 gallons of backwash water is re-cycled on a daily basis.

Associated problems with filters:

(Yes/No)

Air Binding - No	Media Growth - No
Cementing - No	Media Attrition - No
Gravel Mounding - No	Bacteria Growth - No
Media Loss - Minor loss of fines and flats	Uniform Backwash - Yes
Adequate Backwash Rate - Yes	Mudballs - No

Filter Operation comments: The filter media was removed in 2006 and 2007 to allow repainting of the filter boxes due to poor workmanship. None of the typical problems (listed above) were noted at the time that the media was excavated. Phosphate is being added to the applied water to reduce the potential of cementing of the media.

Plant staff has started a filter maintenance program with the assistance of Utility Services. Filter core samples were collected for analysis. Utility Services recommends chemical cleaning of the filter media. A copy of the core sample report and recommendation for cleaning will be provided to us. Filter maintenance should also be expanded to include; raking, probing, and excavation. These activities are essential to detect filter problems including; mudballs, gravel mounding, media loss, cementing, etc.

PLANT TREATED WATER STORAGE/CLEARWELL

Location: NE corner of WTP underneath the high service pumps.

Size: 27FT X 33Ft X 20.3Ft deep, 130,000 Gallons

Percent above grade: NA - Part of WTP building

Low water level: 6.67 feet - 44,653 Gallons
Operating range: 13 feet - 86,640 Gallons

Isolation capabilities: None

Vents: One 3-inch vent located inside the high service pump room

Reservoir Baffling: None

Drains: None - the clearwell can be drained via the high service pumps down to 60-inches, then a portable pump is needed to drain the remainder of the tank.

Overflow: One 24-inch overflow directs any overflow outside to the storm water retention basin.

Access Hatches: Two 3FT X 3FT access hatches are provided -one at the northeast corner of the high service pump room and a second hatch near the west side of the clearwell above filter effluent chamber.

Alarms: High level alarms rings to dialer. The low level alarm automatically shuts down the high service pumps.
Last Inspection: New in 2004
Comments:

The clearwell is new and the structure is in good condition. Staff should plan for a routine inspection of the clearwell in approximately 3 to 5 years.

CHEMICAL FEED

CHLORINE

Chemical supplied: Liquid sodium hypochlorite - 12.5%

UL/NSF approved? Yes

Dosage: CL2 dosage (filter applied) is approximately 3.5 mg/l

Supplier: Jones Chemical

Chlorine Feed Points:

1) Raw water inlet - in use (prior to raw water meter & aeration)
2) Filter applied - in use

3) Clearwell - not in use
4) Finished water (high service discharge) - not in use

T of Feeders: Two LMI metering pumps - LMI C761 -74 rated at 4.0 gal/hr at 175 psi and two spare pumps are provided.

Chlorine Room Description: The chlorine feed room is located at the back of the WTP adjacent to the other chemical feed rooms. The room is set approximately 6 feet below the main corridor.

CL2 Application Measurement: The amount of CL2 applied is determined by the volume of solution pumped from the 250 gallon day tank. The volume used is primarily determined from the graduated level read on the side of the day tank. A radar level indicator is also available for determining chlorine usage; however this device is not often used. The chemical feed rate is controlled by a calibration chamber on the suction side of the chemical feed pump.

Bulk Storage: One 4000 gallon bulk storage tank followed by one 250 gallon day tank. Chlorine flows by gravity from the bulk storage tank to the day tank. Chlorine is supplied by Jones Chem.

Chlorine Safety Features/Summary:

The chlorine room is self-contained since the floor is 6 feet below the WTP main floor level. There are no other gas chlorine safety features.

NSF Approved - Yes
Detection Bottle - NA

FLUORIDE

Chemical supplied: Hydrofluosilicic acid

UL/NSF approved? Yes

Dosage: 0.8 mg/l average application

Chemical feed point: Confluence chamber just prior to the clearwell. The application point is below the water surface.

Supplier: PVS Knollwood (primary), Alexander Chemical (secondary supplier)

Chemical feeders:

1	LMI AA-951	1.0 gph @ 110 psi	Plus one back-up feeder

Chemical feed dosage determination: The fluoride dosage is determined by measuring the amount of acid fed from the day tank by use of a weigh scale that is. calibrated once a year. A radar level indicator is available for determining fluoride drawdown in the bulk storage tank. Finally, the day tank has a graduated scale on the side that can be used to determine the volume of acid fed.

Scales? Radar level sensor and digital scale

Chemical Storage: One 1000 gallon bulk storage tank and one 45 gallon day tank are provided. Acid is gravity fed from the bulk storage tank to the day tank. The bulk tank's usable range is 800 gallons. WTP staff re-configured the day tank's feed line.

Spill protection: The bulk storage tank and day tank have adequate containment. A failure of the support structure immediately after construction of the WTP caused a release of hydrofluosilicic acid. The containment structure prevented release of the acid to other areas of the WTP. A new support structure was installed and has there has been no further problems associated with structural failure.

Piping identification: Color coding is provided on the pump discharge piping in the chemical feed room and throughout the WTP.

Overfeed protection: A flow switch is provided on the incoming raw water line and on the filter applied line. The flow switches are both controlled by the WTP's SCADA control system and must both detect flow in order for the fluoride feed pump to be activated.

Comments: The fluoride feed system was temporarily taken out of service in 2005 due to a problem with the filter applied flow switch sticking. The problem was associated with calcium carbonate precipitating on the flow switch. WTP staff relocated the phosphate feed point upstream of the flow switch and on the top portion of the piping to minimize calcium carbonate precipitation on the flow switch. This measure has prevented further problems associated with the flow switch.

Other Chemical Additions

PHOSPHATE:

Chemicals supplied: Sodium Hexametaphosphate - Hypoclean (filter conditioner)
Orthophosphate - WSU158 (dist. syst. corrosion control)

UL/NSF approved? Yes - Water Solutions Unlimited

Dosage: Sodium Hexametaphosphate: 0.5 mg/l average application
Orthophosphate: 2.5 mg/l average application

Chemical feed points: Hexametaphosphate: Filter applied.
Orthophosphate: Filter effluent chamber (prior to clearwell)

Supplier: Water Solutions Unlimited

Chemical feeders: One metering pump rated between 0 - 4.0 gph.

	model	max feed rate	
2	A 961-368S1 LMI	2.0 gph @ 50 psi	(Hexametaphosphate)
2	B931468 SI LMI	4.5 gph @ 50 psi	(Orthophosphate)

Chemical feed dosage determination: Dosage is determined by measuring the amount of PO4 fed from the day tank based on weigh scale. The amount of PO4 fed from the bulk tank is determined from radar level measurement. The day tank also has a graduated scale that can also be used to determine dosage.

Scales? Radar level sensor and graduated scale - weigh scales are calibrated yearly

Chemical Storage: Hexametaphosphate - Supplied in 30 gal drums and transferred to day tank via hand pump.

Orthophosphate - One 550 gallon bulk storage tank and one 35 gallon day tank. The orthophosphate solution is gravity fed to the day tank.

POLYMER:

Chemical supplied: Anionic Polymer - 433J PWG

UL/NSF approved - Yes

Dosage: 0.3 - 0.7 mg/l average application as product

Chemical feed point: Influent to each claricone (in split treatment - only applying to cone #2)

Supplier: Reb Co.

Chemical feeders: Two metering pumps capable of feeding 0.0006 - 1.0 gph are provided.

	model	max feed rate
2	AP51-86TB LMI	1.0 gph @ 110 psi

Chemical feed dosage determination: Dosage is determined by measuring the amount of polymer fed from a 55-gallon drum. The drum rests on a weigh scale that is used to determine polymer dosage.

Scales? Weigh scale

Chemical Storage: Two 55 gallon carboy drums with mixer are provided with adequate containment.

FERRIC CHLORIDE:

Ferric chloride is no longer applied due to split treatment.

Chemical feed point: Feedpoints remain - Influent to each claricone

Supplier: NA

Chemical feeders: The chem feed pumps were removed.

Scales - Radar level indicator

Chemical Storage: One 4400-gallon bulk storage tank and one 110-gallon day tank remain in place.

WTP operators may investigate the possibility of utilizing the ferric feed room, bulk storage tank, and day tank for fluoride feed after confirming that treatment objectives can be maintained without the use of ferric when one of the claricones is out of service for routine cleaning.

CAUSTIC SODA:

Chemical supplied: 50% Sodium hydroxide

UL/NSF approved? Yes

Dosage: 85 - 95 mg/l average application - fed as 50% solution. Heat tapes were installed on the feed lines and has prevented further problems associated with plugging of these lines.

Chemical feed point: Influent to each claricone (in split treatment - only applying to cone #2)

Supplier: Jones Chemical/Alexander

Chemical feeders: Two metering pumps capable of feeding 0 - 36 gph.

	model	max feed rate
2	Milton-Roy	36 gph @ 50 psi

Dosage Determination: Amount of sodium hydroxide applied is determined by the volume of solution pumped from the 525 gallon day tank. The volume used is determined from the from a radar level indicator and a graduated level read on the side of the day tank. The chemical feed rate is controlled by a calibration chamber.

Chemical Storage: One 8263-gallon bulk storage tank and one 525-gallon day tank are provided. Product from the bulk storage tank flows by gravity to the day tank.

Scales? Radar level indicator

Some minor leakage of product has occurred from the bulk tank and from the day tank fittings. Minor repairs to the bulk storage tank were recently performed to minimize the leakage of product.

PLANT PIPING AND MISCELLANEOUS

	pipe diameter
Well discharge lines:	12-inch & 16-inch raw water lines from wells to WTP
Settled water effluent:	Two 16-inch lines
Filtered water effluent:	Four 16-inch lines
High service suction header:	NA
High service discharge:	One 16-inch line
Backwash:	Four 16-inch lines
Surface wash:	NA
Sludge drain:	Two 4-inch lines
Plant service line:	One 6-inch line

Do any roof drains/other drains enter treatment process? No

Pipe Color Coding: Yes

Plant Cross Connections and Common Walls:

Filter gullets?	No
Common walls?	An air-gap is provided between clearwell influent well and filter wall.
Plant Water RPZ??	Yes, a 6-inch RPZ is installed on the main plant process water line.
Domestic Water?	Yes, a 1 1/2-inch RPZ is installed on the plant's domestic water line.
Chem feed areas?	Protected by RPZ on process water line

All WTP RPZs are tested on an annual basis by HDI.

Appendix C contains a WTP flow schematic

PLANT METERING AND CONTROLS

Plant Domestic Metering:	A Neptune positive displacement meter will be installed.
Raw Water Metering:	Mag meter
High Service Metering:	Mag meter

Plant Controls:

Chemical Feed
- chlorine - PLC controls four feed points
- fluoride - PLC controls one feed point
- chemical transfer pumps: None

Filters - Independent from SCADA, semiautomatic control from filter panel & manual control
Filter Backwash - Semiautomatic from filter panel & manual control
Well Pumps - Automatic & manual control from SCADA
High Service Pumps - Automatic & manual control from SCADA
Elevated Tanks - Automatic control of high service pumps.

Security: Intrusion alarms are provided at each wellhouse and each door has a dead bolt lock. The WTP is fenced except for front. Motion detectors are installed in all rooms with a dialer that notifies the water plant OIC. The ground storage tank site is fenced and equipped with motion sensors. Alarm conditions are sent to the WTP OIC via alarm dialer. Additional fencing is being considered for the front portion of the WTP.

Flexibility in Operation:

Plant clearwell: No
Entire WTP: Yes - Well #8 pump matches system TDH. Pump operates at 80% for WTP operation. Can by-pass a portion of the WTP (head-tank and clarifiers) and pump directly to the filters if needed.

Plant Alarms:

Basement Flooding - Yes	CFE turbidity - Yes - SCADA
Chlorine Leak - NA	Backwash Holding Tank - Low/high level & temp
Chlorine Supply - Bulk height & low SCADA	High Service Pump Discharge Pressure - No *
Low Service Intake Well - NA	Transfer well - NA
Pretreatment Basin Levels - No	Finished Water Reservoir - Low & high level alarm
Pretreatment Sump Pump Failure - NA	Elevated Storage tanks - Low & high level alarm
Filter Level - To SCADA via float level	Elevated tank loss of signal - Yes
Individual filter turbidity - High level on SCADA	Main Control System Failure- No

* The high service pump discharge has a pressure release valve that is set for 170 psi.

Valve Operation:
Are critical valves exercised on a routine basis? Yes

Valve Location	Exercised
Intake Valves	Yes
High Service Isolation valves	Yes
Clearwell Valves	Yes
Influent/Effluent Pretreatment Basins Valving	Yes, during backwash
Low Service Pump Discharge Valving	Yes

WTP staff have established a valve operating program. The program lists 82 large valves (4-in - 16-in) at the WTP. All of these valves are operated on a annual basis and their status is tracked on a spreadsheet.

Interruptions in Operation: None

TABLE 3. LABORATORY

Parameter	*Method	Calibration	Sample Points	Sample Freq.
Alkalinity	Colorimetric		Raw Water Clarified Water Plant Tap	2/day every 4 hrs every 4 hrs
Chlorine	Colorimetric	Zero out each sample	Applied Plant Tap Distribution	every 2 hrs every 2 hrs each sample
Fluoride	Titration Tisab III	Daily	Plant Tap Distribution	once/day weekly
Hardness	Colorimetric		Raw Water Clarified Water Plant Tap	2/day every 4 hrs every 4 hrs
pH	pH probe	Daily	Clarifier top/bottom After CO2 appl Applied & Plant Tap	every 4 hrs
Temp.	Thermometer	Daily	same	1/day
HPC				
Turbidity	2100 A Turbidometer	Each sample	Raw Water Applied Water Plant Tap	every 4 hours
Coliform	Colilert	NA - Lab certification	Raw Water Filter effluent Plant Tap Distribution	1/day 10/mo.

CITY OF FENTON
2012 WATER SYSTEM REVIEW
DISTRIBUTION

WSSN 2270 Supply City of Fenton County Genesee

Date 04/04/12 Reviewed by MFP District 11

Primary Contact:	Don Fralick	Copy To:	Dan Czarnecki
Title:	Distribution Supt.	Title:	Dir of Pub Works
Telephone	(810) 629-4605	Telephone:	(810) 629-2261
Address:	310 South Leroy Fenton, MI 48430	Address:	same

Population: 11,746 Year: 2010 Basis: 2010 Census

Distribution Classification: S-2 Cert.

Operator in charge: Donald Fralick S-1

Other Distribution System Operators:

Al Maddox S-3
Thomas Wright S-2 (Back-up operator)

Complete Treatment (Lime-soda softening) – F-2 required
Operator Certification: - See WTP Sanitary Survey

Comments:

The water system serving the city of Fenton consists of four wells piped to a 4.0 MGD lime-soda softening treatment facility. The water treatment plant was constructed in 2003 and placed into service in 2004. Information pertaining to the water treatment plant can be referenced from Fenton's Water Treatment Plant Sanitary Survey.

Treated water is distributed to a net work of transmission and distribution mains providing service to a population of approximately 12,000. System storage is provided at the top of Denton Hill by use of two ground storage tanks (1.0 MGAL & 0.5 MGAL). A small in line booster pump station is also provided for a subdivision in the vicinity of the ground storage tanks to help provide sufficient operating pressure.

WELL INFORMATION - See WTP Sanitary Survey

WELL ISOLATION:

Well Number	5	6	7	8
Approved Standard Isolation Radius	100 ft.	100 ft.	100 ft.	100 ft.
Available Isolation Radius	>100 ft.	>100 ft.	>100 ft.	>100 ft.
Type of Isolation Control	Mun. own	Mun. own	Mun. own	Mun. own
Approved WHP Plan?	Yes	Yes	Yes	Yes
GW Flows from				
+Basis				
Important Potential Source				
Dist. and Dir. from Well				
Important Major Source				
Dist. and Dir. from Well				
Detects	None	None	None	None

Vulnerability Assessment:

Fenton's wells are determined to be "moderately" vulnerable to volatile organics, pesticides and herbicides. The associated chemical monitoring guidelines are discussed in previous correspondence.

PRODUCTION AND STORAGE REQUIREMENTS

Production History (MGD) - See WTP Sanitary Survey

Five year Max Day 2.25 MGD Date 2007
Five year Avg Day 1.13 MGD

Max Day for capacity requirements 2.25 MGD

Comments:

Water usage has decreased over the past five years and is attributed to a decline in the economy and higher water rates. The city continues to maintain adequate source capacity.

Well Capacity

Total Well Capacity 3,570 gpm 5.14 mgd

Firm Well Capacity 2,450 gpm 3.53 mgd

Firm Well Capacity/Max Day 64%

Total Auxiliary Power
Well Capacity 1,450 gpm 2.09 mgd

Avg. Day/Auxiliary Power Well Capacity 54 %

Comments:
Fenton's total well and firm well capacities have decreased due to a loss of capacity at Well #5; however, available source capacity remains capable of meeting the city's average and maximum day water usage since the city's water usage has also decreased. Peerless Midwest has recommended chemical cleaning, complete overhaul, and installation of a VFD at Well #5. The city intends to proceed with work on Well #5 later in 2012 along with exploring the possibility of constructing a new well at a different depth and/or location. The objective of a new well is to obtain a new source of water with lower hardness; thus, reducing the overall cost of treatment.

PRODUCTION AND STORAGE REQUIREMENTS

STORAGE CAPACITY

	Location: Denton Hill Fac. ID #	Location: Denton Hill Fac. ID #
Volume	1,000,000	500,000
+Type	Gd. Reserv	Gd. Reserv
O.F. Elevation		
Date Constructed	1959	1999
Date Inspected	2000	1999
Date Painted Inside	Concr	Concr
Paint System	NA	NA
Date Painted Outside	NA	NA
Cathodic Protection	NA	NA
High Alarm	Yes	Yes
Low Alarm	Yes	Yes
Average Usable Volume (MGAL)	0.94	0.5

Total Usable Storage 0.94 mil. gal. 0.50 mil. gal.

Total Usable Storage/Max Day 62 %

Total Usable Storage/Avg Day >100 %

Comments:

The total usable storage is slightly less than actual construction due to a 14-inch elevation difference between both tanks. The larger tank is approximately 14 inches higher than the smaller tank, thus the top 60,000 gallons of the larger tank cannot be utilized.

Both tanks are due for a structural inspection. A bid specification for an inspection is being prepared and the intent is to have the inspection out for bid before the end of the city's fiscal year (FY12 – June 30, 2012). The city has included funds in their FY 12 budget for the tank inspection.

DISTRIBUTION

Pumping Stations -

One small in-line booster pump station operates continuously to provide sufficient pressures to the subdivision (55 homes) east of Adelaide Street and Manchester Drive in the vicinity of the ground storage tank. The station consists of 2 in-line submersible pumps each rated at 200 GPM at 50 feet of TDH.

The station operates by manual control only and one pump runs continuously. There is no telemetry to indicate pump status and plant personnel must rely on low pressure complaints from residents of the subdivision to alert them of a pump failure.

This station is not designed to provide fire protection to this area. The primary pump was rebuilt by Layne-Northern in 2005 and there has been no operational problems with the station.

Interconnections With Other Supplies - NA

Distribution Piping

Identify distribution piping materials -

PVC	0 %
D.I.	65%
C.I.	25%
A.C.	10%
Concrete	0 %

Estimated percent of piping with coal tar linings: 0 %

Identify distribution pipe sizes -

2-in	10%
4-in	15%
6-in	20%
8-in	20%
10-in	0%
12-in	30%
14-in	5%
16-in	some

Are there areas where water main breaks are frequent? Yes

Still some areas, however much of the older

piping in the south areas of town have been replaced.

Comments:

Significant distribution system improvements were completed during two DWRF projects (late 1990s and again in the early 2000s). The above distribution system percent by pipe sizes does not reflect these most recent projects.

A third DWRF project was eligible for funding in 2006 and a construction permit was issued for the project which consisted of replacement of deficient mains in the northern portions of the city (Adelaide Street to North Road & several side streets). The project; however, did not proceed in 2006 as a result of higher than expected water rate increases associated with the cost of the water treatment plant and its operation. The city; however, acquired bonding through a separate source and completed the project in 2011.

Are there areas where customers complain of low pressure? Yes

Residents at the top of Denton Hill and in the Jane Hill Subdivision are subject to low pressure when the small booster pump station is not in operation.

Are there areas where aesthetic water quality complaints are frequent? Few areas

Softened water scoured out portions of the water system piping and caused short-term complaints. These complaints subsided several years ago with institution of corrosion control treatment and chemical equilibrium becoming established within the distribution system.

Comments:

Are there areas where fire flows cannot be maintained? Few

Comments:

Last ISO report date? 2006 Rating? Class 4

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

General Distribution Comments:

The city needs to update their water system Reliability Study. The updated study needs to re-access the hydraulic capability of the distribution system. An updated water system general plan also needs to be included with the reliability study. Additional distribution system improvements that are identified in the analysis will also need to be discussed in the study.

Distribution Appurtenances

Hydrants

Number of hydrants app. 602
Number without auxiliary shut-off valves 6
Number that are self-draining app. 10%
Number of inoperable hydrants fixed upon discovery

Frequency of hydrant inspection: yearly or after a fire

Inspection staff: Water dept.

Comments:

System hydrant information is stored in a computer database.

Are there areas where additional hydrants are needed? Some

+If yes, list locations:

A few additional hydrants are needed in the SE portions of the city.

Hydrant location system? Map, database Accurate? Yes
Are hydrants color-coded for capacity? Yes – based on main size

Has this information been provided to the fire department? Yes

Frequency and seasons of hydrant flushing? 1/Yr. Fall

Purpose of flushing? Flush out iron deposits

Is the public notified prior to flushing? Yes

Does flushing follow a specific format? Yes

Is the volume of water used during flushing estimated? Yes

Is a record maintained of hydrant activities? Yes

Comments:
A GIS locating system is in place for maintaining hydrant and valve information.

Valves (excluding hydrant shut-offs)

Number of valves 904
Number of inoperable valves varies
Are there areas where additional valves are needed? Yes

+If yes, list locations:

Additional valving was installed where watermains were replaced.

Valve location system? GIS records Accurate? Yes - 839 valves are located and entered in GIS

Valve Turning Frequencies: No valve turning program is in place. Valves are exercised whenever possible.

Records maintained? Yes

Comments:

The water department has added valve location information to their GIS system and the work is over 90% complete. Operating and maintenance records; however, need to be completed.

Routine valve turning has also not commenced at this time although some valves are turned before a watermain project to verify proper operation. Additional time and/or staffing needs to be dedicated towards establishing an effective valve turning program.

Customer and Service Information

Total number of service connections	4,147
Residential connections	3,627
Commercial/Industrial connections	520
Number of metered service connections	4,147

Identify service line materials and estimate percentages:

+ Lead	0%
Copper	>84%
Galvanized	<15%
Plastic	<1%

The use of plastic pipe for residential service lines has increased recently. The piping material used meets the requirements of the state plumbing code.

Pumpage Distribution (Estimate)

% Residential	80
% Commercial	20
% Industrial	<1

Ownership of Service

From Corp Stop to Curb Stop	City
From Curb Stop to Property Line	NA
From Curb Stop to Meter	Customer
Meter	City

Customer Meters

Types of Meters Used	Sensus – Pos. Displ.
Number of meters w. touch pads or other Remote reading devices	4147
Size of Meters	
Residential	5/8, 3/4, & 1"
Industrial/Commercial	1-1/2 through 4"
Meter Testing/Maintenance Program	tested upon complaint
Average age of meter in system	wide variance
Criteria for change-out	age, poor access, non remote read
Number of Percent Change out per year	5 – 10%
Master Meter Locations	One – Fenton Oaks MHP
Calibration of Master meters	Annually
Meter Reading Staff/Contract	Water Dept.

The city is investigating use of Sensus plastic meters or switching to Neptune or SLC meters in order to meet the new lead-free meter requirement.

Approximately 10% of the city's meters are radio read. There are no plans or program to switch to 100% radio read at this time.

System Growth

Year	No. of Res. Meters Installed	No. of Comm/Ind Meters Installed	No. of CPs Issued	Permitted Amt of WM Feet
2001	241	49	1	2,003 LF
2002	199	62	3	31,251 LF
2003	198	27	4	20,382 LF
2004	142	30	2	1,445 LF
2005	102	11	5	5,095 LF
2006	232	60	3	18,456 (8,879 LF 06DWRF – not done)
2007	46	34	3	640 plus PO4 feed at WTP
2008	52	7	1	Repl exist wm
2009	3	2	1	541 LF
2010	2	4	1	8,261 LF -WM repl.
2011	2	5	2	758 LF

Water Rates

What is your current rate schedule? $5.20 per 1000 Gallons

Are current rates adequate to support O&M And CIPs? Yes

When were the last time rates were adjusted? 2010
Water rate study? When? Yes, March 2005
Meter or ready to serve charge? Yes
Water rate sched/Ordinance available? Yes

Comments:

Fenton's tap-in fee is $1,650 for a residential connection. A substantial increase in water rates occurred in 2005 due to higher than expected treatment costs. A water rate study has been proposed in the city's FY'13 budget.

Repair Parts Inventory

Extra Mains (sect. For each size in service) Yes – one for each
Repair clamps (2 or more for each size) Yes – two for each
Tees, Crosses & Elbows Some
Hydrants Few
Valves Some
Services (corps, curb stops, clamps & lines) Yes

Hydrants, valves, tees, crosses & elbows are available 24/7 from Michigan Pipe & Valve in Flushing, MI.

Safety Issues

Confined space entry program in place % followed (Y/N) Yes – 100%
Trench safety program in place & followed (Y/N) Yes

Comments:

Hydraulic shoring is used in dangerous situations.

PROGRAMS AND PLANS

Cross Connection Program

Ordinance No. Div. 2 of Fenton Code of Ordinances , Sec. 33-31 through 33-37

Date of Ordinance 01/22/01

Approved Program? Yes Date 01/22/01

Staff assigned to program Hydro-Design, Inc. (HDI)

Is Annual Cross Connection Report Required? Yes

Was previous year's annual report received? Yes Date 03/1/12

Was previous year's annual report acceptable? Yes

Inspection Status: An adequate number of inspections are completed each year

Device Testing Frequency: Yearly

Recordkeeping:

Cross connection recordkeeping is adequate.

Comments:

Fenton has maintained an adequate CCCP through contractual services with HDI. HDI continues to perform routine and follow-up inspections, maintains recordkeeping, and prepares the annual report. Approximately 100 – 120 inspections are completed each year and all high priority accounts are inspected.

Annual Pumpage Reports

Is Annual Pumpage Report Required? Yes

Date received? 01/04/12

Monthly Operation Reports

Are Monthly Operation Reports required? Yes

Were all previous year MOR's received? yes Timely? yes

Are previous year's MOR's Acceptable? yes

Consumer Confidence Reports

Is the annual CCR required? Yes

Was the previous year's report received? Yes

Was the previous year's certification form received? Yes

Emergency Response Plan

Date of most recent plan ...Contingency Plan - Oct, 2008 Acceptable? No

Filed where? Water Dept, MDEQ

Comments:

The city's 2008 water system contingency plan needs to be replaced with a water system Emergency Response Plan

General Plan

Date of most recent plan 2008 Acceptable? Yes

Filed where? Water Department, MDEQ

Comments:

Fenton's most recent water system general plan is kept updated in the city's GIS system. A copy of the general plan printed from the city's GIS system was provided to us.

Reliability Study

Date of most recent study Dec. 1993 Acceptable? No
2001, 2005 – DWRF Project Plans

Filed where? Basic data.

Comments

An updated water system Reliability Study needs to be completed.

Bacteriological Sample Site Plan

Date of approved plan January 2010

Are samples still being collected in accordance with the plan? Yes

The city uses their certified laboratory for total coliform analysis in drinking water.
The sampling site plan needs to be updated to reflect staffing changes in the water department.

Lead/Copper Monitoring Status:

The city has remained in compliance with Pb/Cu regulations and has met both action levels in all applicable rounds (6 rounds conducted). Triennial monitoring is in effect and the next round of samples will cover the three year period from 2012 through 2014. 20 samples are due from the distribution system and these samples need to be collected prior to September 30, 2014.

Conclusions and Recommendations

In general, the Fenton Water System Review (WSR) covers the major aspects of the Fenton water supply including: source, treatment, transmission, distribution, and storage. Each one of the above categories are evaluated on the basis of adequacy, maintenance, reliability, and operation. The WSR also includes a check on the status of Fenton's operator certification and the cross connection control programs. Finally, water quality and Fenton's monitoring programs are reviewed.

Based upon the Fenton 2012 WSR , Fenton's water system shall maintain a "**Satisfactory**" rating. Further discussion regarding existing facilities, reliability, operation, and maintenance are discussed below:

Source:

The city has four production wells available for service with a total and firm capacity of 5.14 million gallons per day (MGD) and 3.53 MGD respectively. This continues to represent a modest reduction in source capacity from 5.4 MGD (total capacity) and 3.8 MGD (firm capacity) noted in 2005. The reduction in source capacity is attributed to a reduction in capacity of Well #5. Also, some loss in capacity was noted at Well #8.

Although Fenton's source capacity has decreased, water usage has also continued to decrease. The average day demand has decreased from 1.5 MGD (2000-2004) to 1.08 MGD (2009-2011). Maximum day demands that ranged between 2.4 to 3.3 MGD (2000-2004) have decreased to between 1.5 and 1.9 MGD after 2007.

Additional source capacity will not pose a critical need provided that the city's maximum day demand remains below 2.80 MGD and the existing source capacity can be maintained. The city has investigated measures to restore or, at least, maintain its current source capacity and includes chemical clean of Well #5 and installation of a variable frequency drive to control pump output. Chemical cleaning was also recommended for Well #8 within the next several years to help improve well performance and prevent further loss of specific capacity. Although the rate of residential and commercial development remains limited, we encourage the city to proceed with the recommended work in order to maintain source capacity.

Next, the city has authorized a consultant to investigate several potential wellsites with the overall objective of acquiring a new source of water having less non-carbonate hardness; thus, reducing treatment cost and residuals. Please keep us updated concerning the status of this investigation. Finally, as a reminder, any test-well drilling needs to be approved by our office prior to proceeding with the work.

Next, Wellhouses #6 and #7 have been refurbished including replacement of the roofs. These buildings are in adequate structural condition.

Finally, it was noted that the city utilizes Peer-Less Midwest to perform annual maintenance on all 4 production wells which includes conducting pump performance tests on a yearly

basis. We encourage the city to maintain this level of annual maintenance as it will help to increase the useful service life of this infrastructure. Finally, routine pump and motor maintenance is due for Well #6.

Filters:

The water treatment plant (WTP) includes four mixed media filters. Since the repainting of the filter boxes (2006 and 2007), there have been no significant operational problems associated with the filters.

The WTP operators continue to gain the operating experience and knowledge unique to this treatment facility. Staff maintains filter performance profiles including time turbidity graphs and the information is maintained in the WTP's SCADA system. A preventative maintenance program has also been started with the assistance of Utility Services. The maintenance program included collection of filter core samples. Also, a chemical cleaning of the filter media was recommended. Please provide us with a copy of the core analysis report and the procedure proposed for the cleaning of the filter media.

Finally, WTP operators should continue to work towards expanding their filter maintenance program to include other filter investigation techniques. This should include; rodding and raking the filter media. Partial excavation of filter media can also be performed while a filter is out of service for routine maintenance. We encourage WTP operators to continue to develop and maintain a preventative maintenance program for the WTP filters.

Unaccounted Water Use (loss):

Fenton's unaccounted water use (loss) ranges between 26 and 28 percent. Typical unaccounted water loss in municipal water systems should not exceed 10-15%. Unaccounted water loss greater than 15% could be attributed to undetected leakage in the distribution system, flushing & fire fighting activities, water theft, and un-metered customers.

Next, a portion of the unaccounted water use is attributed to several unmetered customers including process water used for production at the WTP. It is our understanding that metering will be provided at the WTP to account for process water usage. There are; however, several un-metered municipal buildings that also contribute to unaccounted water use. These buildings need to be metered in order to obtain a more accurate determination of unaccounted water loss in Fenton's water system.

WTP Residuals/Sludge Disposal:

Lime sludge produced during clarification is discharged to the WTP's sludge lagoon under the provisions of the renewed groundwater discharge permit GW 1010298 issued in January 2011. The city has maintained compliance with the renewed groundwater discharge permit. The renewed permit allows a maximum volume discharge of 22,000 gal/day (volume based – 40% metering flow and 60% solids). The new permit also allows

for a maximum 100,000 gal/day discharge for clean out operations. The renewed permit will allow for greater flexibility for clarifier clean out operation.

Chemical Feed:

WTP staff continues to maintain a split treatment process; thus the ferric feed system has remained out of operation. WTP staff are considering the possibility of utilizing the ferric feed room for fluoride feed since the ferric chloride bulk storage tank is more capable for accepting required delivery volumes of hydrofluosilicic acid.

The ferric chloride feed room may be utilized for fluoride feed; however, the existing ferric chloride will need to be properly disposed. Next, although the downtime needed for routine cleaning of each clarifier will be reduced as part of the revised groundwater discharge permit requirements, operators will need to confirm that treatment plant's objectives are not compromised without the addition of ferric during routine cleaning of a clarifier.

Finally, the repairs to the caustic soda bulk storage tank and the fittings appear to be intact. The structural condition of the bulk storage tank will need to be closely monitored and any further repairs that are necessary should be completed in a timely manner.

Treated Water Storage:

The WTP has a 130,000 gallon treated water clearwell. The clearwell is located in the northeast corner of the WTP underneath the high service pumps. The structure was constructed in 2003 along with the WTP and is in good condition. WTP operators should plan for a routine inspection of the clearwell within the next 3 to 5 years.

High Service Pumping:

The WTP has four high service pumps ; however, a lightning strike in July 2011 took 3 of the 4 pumps out of service. The electrical surge damaged the pump drivers and these units needed to be replaced. Although, this occurrence did not cause failure of WTP operation, it jeopardized the WTP's overall reliability during the time that the three high service were out of service.

We encourage the city to investigate and proceed with installing full lighting surge protection at the WTP in order to protect the electrical components and controls that are critical to the operation of the WTP.

WTP Security:

Improved security measures should be provided at the WTP; however, the city has had limited success at securing funding toward providing additional security fencing and cameras around the front of the WTP site. Given the importance of improving overall treatment plant security, it may be worthwhile for the city to pursue other funding sources to complete this project.

Distribution System:

Distribution Piping:

The city has maintained an active watermain replacement program since the late 1990s. Completion of two Drinking Water Revolving Fund (DWRF) projects and other distribution system projects has resulted in significant improvements in the southeastern and northern portion of the city's distribution system.

We are pleased with the effort taken towards improving the water distribution system. The city; however, will need to update their most recent water system Reliability Study. Administrative Rule 1203 of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), requires a public water supply to submit and update a reliability study once every 5 years. Our records show that the city of Fenton's most recent reliability study was completed in 2005 as part of the Drinking Water Revolving Fund Project Plan submittal; thus, in accordance with Act 399 requirements, an updated reliability study needs to be completed. The updated study needs to review the city's 5-year and 20-year water use projections and assess the hydraulic capability of the distribution system. An updated water system general plan and capital improvements program also needs to be prepared as part of the updated study. A list of items that needs to be included in the reliability study was provided to you. Finally, we would be available, as needed, to meet with you and your consultant to discuss the scope of the study in more detail.

Treated Storage:

Treated water storage is provided by two ground storage tanks located at the top of Denton Hill. According to our records, approximately 12 years has elapsed since an inspection of these tanks has been performed. It is our understanding that the tank inspections have been included in the city's fiscal year (FY) 2012 budget and that the project may be placed out to bid prior to the end of Fenton's FY 2012. Please inform us as to when the tank inspections will be conducted. Finally, we would be interested in receiving a copy of each tank inspection report when they become available.

Isolation Valves:

There has been some improvement noted in the water department's valve program, specifically with the establishment of valve records. Some valves are also being turned prior to proceeding with routine flushing and water distribution projects to verify proper operation; however, a percentage of these valves are left compromised after being turned. As we discussed, these valves will need to be repaired or eventually replaced. Finally, the water department needs to continue to increase the time and effort towards establishing an

effective valve turning program. Isolation valves should be turned once every several years and this may best be accomplished by splitting the city's distribution system into quadrants. Valve turning should then be conducted within a specific quadrant each year.

General Plan:

Fenton's most recent water system general plan is kept updated in the water department's GIS system. As part of updating Fenton's 2005 Reliability Study, an updated general plan also needs to be prepared (discussed above).

Emergency Response Plan:

The city's water system contingency plan was updated, at our request, late in 2008. The 2008 contingency plan; however, needs to be replaced with an Emergency Response Plan (ERP). A recent revision to the Administrative Rules of Act 399 now requires an ERP in place of the contingency plan. The ERP provides an outline to follow in the event of a water related emergency (loss of pressure, contamination, etc.). The ERP is similar to a water system contingency plan; however, the ERP calls for discussion of various types of water utility operational plans that may be utilized during a water related emergency. An ERP template was provided to you and can be used for preparing Fenton's ERP. We will review the completed ERP during our next routine surveillance visit.

Sample Site Plan:

Fenton's most recent bacteriological sampling site plan (updated in 2010) needs a minor revision to reflect staffing/contact changes. A sampling site plan template was provided to you and this template can be used in preparing an updated plan. Please provide us with a copy of the updated sampling site plan.

Closing Remarks:

We recognize the number of water system improvements completed by the city since 2000. We encourage the city to continue to provide the resources necessary for water department and WTP staff to continue to operate and maintain the water system in an effective manner. We will follow-up with you on the above items during future site visits.

Report Summary

The following is a list of items discussed in this report which needs to be addressed by the city. No priority is implied by the order. Page references are in parentheses.

1. Proceed with the recommended work on Well #5 to maintain its capacity. Perform routine pump/motor maintenance on Well #6. Budget for chemical cleaning of Well #8. (4, 5, 32, 33)

2. Install metering for the WTP's process water. Eliminate any remaining un-metered accounts. Update Fenton's unaccounted water (loss). (1, 33)

3. Install remaining security fencing and cameras at the WTP. (2, 34)

4. Investigate – install lightning surge protection at the WTP. (6, 34)

5. Maintain – expand the on-going filter maintenance program. (11, 33)

6. Inspect the WTP clearwell within the next 3 to 5 years. (12, 34)

7. Inspect both ground storage tanks and provide us with a copy of the inspection report. (22, 35)
8. Update Fenton's most recent water system Reliability Study. (24, 30, 35)

9. Expand the water distribution system valve program. (26, 35, 36)

10. Prepare a water system Emergency Response Plan. (30, 36)

Evaluation of Community Water Supply - Water System Review Summary				
Name of Supply: City of Fenton			WSSN:	2270
County: Genesee			District:	11
Evaluator: MFP			Date:	4-Apr-2012
Overall Rating	Satisfactory: X	Marginal:	Deficient:	

	N/A	Sat.	Marg.	Def.
General				
Operator Certification		X		
Ownership		X		
Source				
Intake Construction & Maintenance		X		
Standby Power		X		
Isolation		X		
Capacity		X		
Storage				
Construction		X		
Controls		X		
Maintenance		X		
Capacity		X		
Distribution				
Interconnections with other Supplies	X			
Pump Stations		X		
Operational Concerns & Maintenance		X		
Hydrants		X		
Valves			X	
Customer Service Information		X		
Meters		X		
Program Compliance				
Cross Connections		X		
Annual Pumpage Reports/MORs		X		
CCR		X		
Emergency Response Plan		X		
General Plan		X		
Reliability Study - needs to be updated			X	
Permits		X		
Capacity Development				
Monitoring				
Bacteriological		X		
Chemical		X		
Lead/Copper		X		
Radiological		X		
DBPR		X		
Treatment				
Disinfection		X		
Pretreatment		X		
Fluoride		X		
Filtration		X		
CT	X			
Chemical Addition		X		
High Service Pump Capacity		X		
Control Systems		X		
Analytical Capabilities		X		
Maintenance		X		

Appendices

Appendix A

Sludge Disposal Requirements

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

Agricultural Use Approval #05-AUA-001
for
Lime Sludges from Public Water Treatment Plants

In accordance with the provisions of Section 11506(1)(g) of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and specifically R 299.4111 of the administrative rules promulgated under Part 115, an agricultural use approval is granted by the Director of the Michigan Department of Environmental Quality (MDEQ) or the authorized representative of the Director for lime sludges generated from softening potable water (Material) at Public Water Treatment Plants (Generator).

This approval is subject to the following conditions:

1. This approval amends and replaces the Agricultural Use Approval #92-A-001 issued on May 8, 1992.

2. This approval only applies to lime sludges and does not apply to other types of treatment plant sludges that contain alum, ferrous sulfate, ferric chloride, etc..

3. The Material may be applied only to agricultural or silvicultural lands that need pH adjustment as demonstrated by laboratory soil tests that are currently in use or that will be used for crops in the next growing season. Prior to application, the Generator shall ensure that the soil sampling and testing is done to determine the appropriate rate required for proper pH adjustment.

4 The Material shall be licensed with the Michigan Department of Agriculture pursuant to the Michigan Liming Materials Law, 1955 PA 162, as amended, as a "liming material."

5. The Generator shall ensure that all persons involved with the land application of the Material comply with the conditions of this approval.

6. The staging or use of the Material shall be done in a manner that does not violate any local, state, or federal law, statute, or ordinance.

7. The Material shall be applied at a distance greater than 75 feet from surface waters, drinking water wells, or residences.

8. The Generator shall ensure that appropriate, calibrated equipment is used to apply the Material to ensure accurate and uniform distribution.

9. The Material shall be incorporated into the soil as soon as feasible following application to ensure maximum benefit for soil neutralization. This condition does not apply to applications of the Material on established forage stands or fields managed under no-till cropping conditions.

10. The Material shall not be applied in a manner that adversely restricts soil permeability.

11. Vehicles used to transport the Material shall comply with the Michigan Vehicle Code, 1949 PA 300, as amended (MVC), or the rules promulgated under the MVC. The Material shall be covered or sufficiently contained to prevent loss to the environment during transport and delivery to the application site.

12. The Material shall only be staged or stockpiled at or on the field application sites. Material staged in fields prior to land application shall be placed in locations that adhere to the isolation distance specified in Condition 7 All Material must be used at the site as agricultural lime within the calendar year. Any remaining Material must be removed and disposed of at a properly licensed solid waste disposal facility.

13. Appropriate measures shall be taken to prevent runoff and sedimentation to surface waters in accordance with Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the rules promulgated under Part 91.

14. Staging, transportation, and use of the Material shall not cause visible emissions as defined by Part 55, Air Pollution Control, of the NREPA, or the rules promulgated under Part 55

15. The Material shall not come into direct contact with surface water or groundwater or be placed in a 100-year flood plain or wetland area as defined by Part 115.

16. The Generator shall maintain records on the amount of Material applied at each site and the address and legal property description of each site used. The Generator shall maintain all records for four years after the Material was last applied and shall be made available for review by the Director, or the Director's authorized representative, upon request.

17. This approval does not apply to Material mixed with other wastes that are not inert as defined by Part 115.

18. Every Generator that intends to utilize this approval shall notify the Chief of the MDEQ, Waste and Hazardous Materials Division, on the form provided in Appendix A, prior to operating. This form includes a certification statement that the Generator understands and will comply with all of the conditions of the approval.

19. This approval does not preclude the Generator from disposing of the Material in accordance with Part 115 at a properly licensed solid waste disposal facility or at an out-of-state facility in accordance with that state's waste disposal regulations.

20. In the event that the Material is determined by the MDEQ to pose unacceptable risks to public health, safety, welfare, or the environment, a person responsible for the placement or disposal of those Materials shall remain liable for the performance of response activities and response activity costs as provided by Part 201, Environmental Remediation, of the NREPA.

21. This approval shall immediately become void for any of the following reasons:

a. The Generator does not comply with the conditions of this approval

b. Additional information demonstrates the Material is not appropriate for agricultural or silvicultural use.

c. Additional information demonstrates the Material is causing environmental contamination.

d. New state or federal regulations are promulgated that would cause this approval to be invalid.

22. Violation of the conditions of this approval will cause this approval to become immediately invalid and is subject to the enforcement provisions of Part 55, Part 91, Part 115, and Part 201 or other applicable state and federal laws/statutes.

STATE OF MICHIGAN
Department of Environmental Quality

By: _____
George W. Bruchmann, Chief
Waste and Hazardous Materials Division

Dated: 7/5/05

Attachment

MICHIGAN DEPARTMENT OF AGRICULTURE
Pesticide and Plant Pest Management Division
P.O. Box 30776, Lansing, MI 48909
Phone: (517) 241-2978 FAX: (517) 355-4540
www.michigan.gov/mda

2010 LICENSE APPROVAL

Liming Product License

SHOEMAKER SERVICES INC
380 S FENWAY DRIVE

FENTON MI 48430

CITY OF FENTON WATER TREA 0231
380 S FENWAY DR
FENTON MI 48430
(810) 629-8600

Neut. Value 1189.97 LBS Per Cubic Yard

LICENSE YEAR		MIN NEUT. VALUE	MIN % THROUGH MESH SCREEN 8	60	100
2010	AGG LIME				

Donald Koivisto, Director
Michigan Department Of Agriculture
EXPIRES December 31, 2010

AGRICULTURAL USE APPROVAL #05-AUA-001
APPENDIX A
FACILITY CERTIFICATION FORM

PART A – Facility Information

Facility Name: Fenton Water Plant

Mailing Address: 301 S. Leroy St
Fenton MI
48430

Contact Person: Stephen Guy

Phone number: (810) 614-1761

Expected Startup Date: 10/21/08

County: Genesee

Expected Completion Date: 11/21/08

PART B – Description of Operation

Briefly describe methods of collection, processing, end product usage, and methods of land application of lime residuals (Attach additional sheets as necessary)
Lime is used for water softening. Lime settles during treatment and is sent to a Lagoon. The Lime residual is cleaned out of the Lagoon using an excavator. The material is hauled by Truck to farmers fields

Briefly describe contingency plans for proper management of lime residuals if the facility unexpectedly is unable to comply with the conditions of this designation (Attach additional sheets as necessary)
Land fill Lime Residuals.

PART C – Certification

I CERTIFY, UNDER PENALITY OF LAW, THAT I READ AND UNDERSTAND MY OBLIGATIONS RELATING TO THE CONDITIONS CONTAINED IN THE AGRICULTURAL USE APPROVAL #05-AUA-001.

Signature	Date
Stephen D. Guy	10/21/08
Print or type name of person signing: Stephen D. Guy	Signer's Title: Water Treatment Facility Superintendent

PRODUCT LABEL

PROLIME - 015

Neutralizing Value **1,237** **lbs. Per cubic yard (expressed as Calcium Carbonate Equivalent)**

PROLIME CORPORATION

58610 VAN DYKE

WASHINGTON, MI 48094

MICHIGAN DEPARTMENT OF AGRICULTURE
Pesticide and Plant Pest Management Division
P.O. Box 30776, Lansing, MI 48909
Phone: (517) 241-2978 FAX: (517) 355-4540
www.michigan.gov/mda

2008 LICENSE APPROVAL

Liming Product License

PROLIME INC
ROBERT ROGERS
58610 VAN DYKE
WASHINGTON MI 48094

PROLIME INC 0045

(586) 781-7070

Neut. Value 1170 LBS Per Cubic Yard

LICENSE YEAR	MIN NEUT. VALUE	MIN % THROUGH MESH SCREEN		
2008 PROLIME - 001				

Neut. Value 1237 LBS Per Cubic Yard

LICENSE YEAR	MIN NEUT. VALUE	MIN % THROUGH MESH SCREEN		
2008 PROLIME - 015				

Neut. Value 1381 LBS Per Cubic Yard

LICENSE YEAR	MIN NEUT. VALUE	MIN % THROUGH MESH SCREEN		
2008 PROLIME - 008				

Neut. Value 1939 LBS Per Cubic Yard

LICENSE YEAR	MIN NEUT. VALUE	MIN % THROUGH MESH SCREEN		
2008 PROLIME - 005				

Donald Koivisto, Director
Michigan Department Of Agriculture
EXPIRES December 31, 2008

Appendix B

Ground Water Discharge Permit

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES & ENV
LANSING

RICK SNYDER
GOVERNOR

New Permit

January 3, 2011

FEB 14 2011

Mr. Stephen Guy
City of Fenton
15300 North Road
Fenton, Michigan 48430

Dear Mr. Guy:

Enclosed is the Authorization to Discharge, GW1010298, issued by the Department of Natural Resources and Environment (DNRE) on January 3, 2011. The Authorization provides for the discharge by Fenton Water Treatment Plant, of a maximum of 22,000 gallons per day (8,330,000 gallons per year) of water treatment system wastewater.

The issuance of this permit does not authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Natural Resources and Environment permits, or approvals from other units of government as may be required by law.

Please review carefully the conditions of the Authorization. In particular, please notice that any change in the discharge will require a new Authorization by the DNRE.

Also enclosed are Compliance Monitoring Report (CMR) forms for your facility. Please forward this information to the person responsible for your compliance monitoring.

Questions concerning this Authorization can be directed to the Ground Water Permits Unit, Permits Section, Water Resources Division, DNRE, telephone: 517-373-8148, or the Water Resources Division, Lansing District Office, telephone: 517-780-7915.

Sincerely,

James R. Janiczek, Chief
Groundwater Permits Unit
Permits Section
Water Resources Division

Enclosure

cc: Genesee County Health Department
Ms. Mary Vanderlaan, DNRE - Lansing

PERMIT NO. GW1010256

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT

GROUNDWATER DISCHARGE PERMIT

In compliance with the provisions of Michigan's Natural Resources and Environmental Protection Act, 1994 P.A. 451, as amended (NREPA), Part 31, Water Resources Protection, and Part 41, Sewerage Systems,

City of Fenton
301 South Leroy Street
Fenton, Michigan 48430

is authorized to discharge 22,000 gallons per day, 100,000 gallons per day (daily max. during backwash events only), 8,330,000 gallons per year, of water treatment system wastewater from the **Fenton Water Treatment Plant** located at

15300 North Road
Fenton, Michigan 48430

designated as **Fenton Water Treatment Plant**

to the groundwater of the State of Michigan in accordance with effluent limitations, monitoring requirements and other conditions set forth in this permit.

Rule Authorization:	**2210(y)**
Wastewater Type:	**Water Treatment System Wastewater**
Wastewater Treatment Method:	**Special Classification**
Wastewater Disposal Method:	**Seepage Bed - Rapid Rate**

The issuance of this permit does not authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Michigan Department of Natural Resources and Environment (Department) permits, or approvals from other units of government as may be required by law.

This permit is based on a complete application submitted on February 26, 2007, as amended.

This permit takes effect on February 1, 2011. The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules.

This permit and the authorization to discharge shall expire at midnight, February 1, 2013. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department by August 5, 2012.

Issued January 3, 2011.

James R. Janiczek, Chief
Groundwater Permits Unit
Permits Section, Water Resources Division

PART I

1. Effluent Limitations

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge a maximum of 22,000 gallons per day (daily average) 100,000 gallons per day (daily max. during backwash events only), 8,330,000 gallons per year, of water treatment system backwash from the monitoring points listed below to the groundwater in Fenton Township, Genesee County, Michigan. The discharge shall be limited and monitored by the permittee as specified below.

Parameter	Maximum Daily Limit	Units	Frequency of Analysis	Sample Type
EFFLUENT				
Monitoring Point EQ-1 + EQ-2				
Flow	22,000	GPD	Daily	Calculation
	100,000 (Daily Max. during backwash events only)	GPD	Daily	Calculation
Flow	8,330,000	GPY	Annually	Calculation
Monitoring Point EQ-1				
Dissolved Manganese	(report)	mg/l	Monthly	Grab
Dissolved Iron	(report)	mg/l	Monthly	Grab
Dissolved Arsenic	(report)	mg/l	Monthly	Grab
pH (Minimum)	(report)	S.U.	Monthly	Grab
pH (Maximum)	(report)	S.U.	Monthly	Grab
Sulfate	250	mg/l	Monthly	Grab
Chloride	250	mg/l	Monthly	Grab
Sodium	150	mg/l	Monthly	Grab
Monitoring Point EQ-2				
Dissolved Manganese	(report)	mg/l	Monthly	Grab
Dissolved Iron	(report)	mg/l	Monthly	Grab
Dissolved Arsenic	(report)	mg/l	Monthly	Grab
pH (Minimum)	(report)	S.U.	Monthly	Grab
pH (Maximum)	(report)	S.U.	Monthly	Grab
Sulfate	250	mg/l	Monthly	Grab
Chloride	250	mg/l	Monthly	Grab
Sodium	150	mg/l	Monthly	Grab

a) Sampling Locations

Influent flow, effluent flow, and land application rate shall be measured in accordance with the approved sampling plan. The location and method of collecting and analyzing effluent quality and soil samples shall be in accordance with the approved sampling plan. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative.

2310

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 9, 2013

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

WSSN: **02310**

Dear Mr. Johnson,

SUBJECT: City of Flint, Water Treatment Plant Sanitary Survey

This letter confirms my visits with Mr. Brent Wright, water treatment plant (WTP) superintendent, on December 13, 2012, and January 16, 2013, and summarizes the subsequent review and discussion of the water supply facilities serving the city of Flint. The purpose of this meeting was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). In addition, the enclosed Water System Sanitary Survey was updated to gather information on the Flint WTP.

Our updated survey visit confirms that intermediate chlorination was installed at the primary clarifier outlet in 2010 and is being used in WTP test runs. Also, a more permanent de-chlorination feed system was installed in the Pump Station #4 building to de-chlorinate filter to waste water prior to discharge to the Flint River during routine test runs. These provisions increase confidence in the WTP's ability to produce water that meets the drinking water standards. Subsequent WTP test run report continue to show that the WTP can operate as an effective stand-by treatment facility.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source (Including P.S. 4)	**Deficiencies Identified**
Treatment	Recommendations made
Distribution System	Not evaluated – see dist. survey
Finished Water Storage	Recommendations made
Pumps (All dist. Pumping)	Not evaluated – see dist. survey
Monitoring & Reporting	No deficiencies/recommendations
Management & Operations	Recommendations made
Operator Compliance	Recommendations made
Security	No deficiencies/recommendations
Financial	Not Evaluated – see dist survey
Other	No deficiencies/recommendations

The following deficiencies are violations of Act 399 and must be resolved in order to return the water system to compliance.

1. R 325.11206 (1) of Act 399 requires a Type-I public water supply (PWS) to provide a means to continuously supply finished water to the entire distribution system during periods when normal power service is interrupted. Although electrical power for the WTP is provided by a dual 46-KV primary electrical feed, the dual feed originates from the same switch yard, and this configuration will not address power issues that could occur with the generating utility or transmission grid. As an emergency stand-by WTP, additional provisions for stand-by power have not been required; however, additional provisions such as on-site generation will need to be provided if the WTP becomes a full-time operating facility.

Next, it is hoped that the following recommendations will prove useful in enhancing the operation and maintenance of your PWS.

A. Operate low service pumps #3 and #4 at Pump Station #4 (P.S. #4) periodically between WTP test runs to ensure that the pumps and switchgear remain in operating condition. Replacement of the switchgear is also recommended in order to increase the flexibility of operation of the low service pump station.

B. Flint's long-term source of drinking water is expected to be determined soon as the scope of the Karegnondi Water Authority (KWA) is finalized. The city will need to determine the future use level of P.S #4 (low and high service pumping) to determine the amount of pumping capacity and other station improvements that will be needed.

C. Full chlorine concentration times contact time (CT) credit through the ozone contactor basins cannot be provided since ozone residuals cannot be maintained through the entire contactor basin. An additional sampling tap at the end of the diffusion chamber Cell #1 is recommended since this will allow for a slight increase in the CT determination.

D. Control of moisture in the flocculator control room is recommended in order to maintain other controls and electrical components in good working condition.

E. Although it is not practical to attempt lime softening given the limited duration of WTP test runs, longer plant runs (10 days or longer) are recommended if proficiency in softening is desired. The need for future softening; however, will depend on the city's long-term source of drinking water. Longer WTP test runs will also help determine filter run times and provide experience in backwashing filters during plant production.

F. Correct the piping constraint in the west wash water supply line. The existing line has an 8-inch restriction within an existing valve vault that limits flow. Elimination of the bottleneck will increase the capacity of the west wash water supply.

G. Provide emergency air-pack respirators for the WTP operators for use in the event of a chlorine gas leak at the WTP.

H. Provide an adequate seal on the door sweep for the chlorine gas room interior door. This provision will reduce the possibility of an accidental chlorine gas leak spreading to the remainder of P.S. #4.

I. Inspect the 3.0 million gallon clearwell and verify the integrity of the concrete base around each of the manhole vent. Please provide us with a copy of the inspection report.

J. The WTP is equipped with numerous valves that are essential for operation and isolation critical components of the WTP. We recommend that WTP operators continue to maintain and expand their program of operating critical WTP valves. Maintaining an active valve program will help to keep WTP valves in good operating condition; thus maintaining the operating reliability of the WTP.

K. Prepare an accurate WTP yard piping diagram. The yard piping diagram should denote the location of buried piping on WTP grounds and their points of connection to the WTP, reservoirs, control stations, and the elevated tank.

L. Designate a back-up operator for the WTP. The back-up operator must have a complete treatment (F-4 or higher) certification.

Please submit a letter by *May 30, 2013,* that outlines the city of Flint's plans and schedule to address the above items.

If you have any questions, feel free to contact me at (517) 335-6122; prysbym@michigan.gov; or Department of Environmental Quality, Office of Drinking Water and Municipal Assistance, Lansing District Office, 525 West Allegan Street, 4th Floor North, 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
Mr. Brent Wright, WTP Superintendent, City of Flint
Mr. Edward Kurtz, Emergency Manager, City of Flint
Ms. Inez Brown, Clerk, City of Flint

DEQ Office Address 1
DEQ Office Address 2
Phone:
Fax:

WSSN: 2310

Office of Drinking Water and Municipal Assistance

Lansing District Office

Water System Sanitary Survey

Flint Water Treatment Plant

Jan-13

DEQ

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Flint - WTP
County: Genesee
Evaluator: Michael Prysby, P.E.

WSSN: 02310
District: 11
Date: 1/16/2013

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source - Including Pump Sta. 4						X	
Construction & Maintenance	op. L.S. pumps #3 & #4 periodcally				X		
Standby Power	additional st-by power needed					X	
Isolation		X					
Source Water Protection				X			
Capacity	Dtm. future use level for firm cap.				X		
Treatment					X		
Disinfection	CL gas rm. door sweep seal needed				X		
Fluoride				X			
Phosphate Addition		X					
Softening	Attempt softening to gain proficiency				X		
Iron/Manganese Removal		X					
Arsenic Removal		X					
Pretreatment	Control moisture in floc. control rm.				X		
Filtration (gravity or membranes)	Elim. bottleneck in w. wash water line				X		
C*T	Add O3 sample tap in diff. ch. Cell 1				X		
Other				X			
Distribution System (see dist. Survey)			X				
Interconnections w/ Other WS			X				
Hydrants & Valves			X				
Service Lines & Metering			X				
General Plan			X				
Cross Connections			X				
Construction & Maintenance			X				
Capacity			X				
Finished Water Storage					X		
Construction & Maintenance	Inspect 3 MGAL Well				X		
Controls					X		
Capacity				X			
Pumps (All Distribution System Pumping Fac.)			X				
Construction & Maintenance			X				
Controls			X				
Capacity			X				
Monitoring & Reporting				X			
Bacteriological Monitoring				X			
Chemical Monitoring				X			
MOR or Annual Pumpage Report				X			
Consumer Confidence Report				X			
Analytical Capabilities				X			
System Management & Operations				X			
Owner Responsibility				X			
Capacity Development				X			
Reliability Study			X				
Operations Oversight	Expand valve program, yard piping dia				X		
Permits				X			
Operator Compliance					X		
Operator Certification	Designate back-up operator				X		
Technical Knowledge & Training				X			
Security							
Emergency Response Plan				X			
Site Security (Fences, Alarms..)				X			
Financial							
Rates			X				
Budget & Capital Imp. Plan			X				
Other	Provide respirators for CL gas leak				X		

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

FLINT WATER TREATMENT PLANT
SANITARY SURVEY
EVALUATION FORM

BASIC DATA

Name of Supply: City of Flint

Review Dates: 12/13/2012
01/16/2013

WSSN: 2310

Reviewed By: MFP

Mailing Address: 1101 South Saginaw Street
Flint, Michigan 48502

Plant Address 4500 North Dort Highway
Flint, Michigan 48505

City Officials
Mayor: Dan Walling
City Administrator: Mike Brown - EFM
Utilities Director: Howard Kroft
Water Plant Superintendent: Brent Wright - Provisional Supt.
Operator-In-Charge (OIC): Mike Glaskow - F-1
Designated Backup Operator: Not designated

MDEQ Conclusions/Recommendations:

WTP operators continue to pursue adequate operator certification. The ongoing WTP test runs provide WTP operators the opportunity to gain experience in all F categories in accordance with the certification requirements set forth specifically for the Flint WTP, It is important for all operators to continue to maintain their record of all hours worked during WTP test runs since their eligibility to write any higher level F exam is based upon their experience accrued during actual WTP test run operation. Finally, the WTP has designated their OIC; however, a back-up operator has not been designated. A back-up operator holding a complete treatment certification needs to be designated for the Flint WTP.

Water Treatment Plant (WTP) Operators:

Brent Wright	F-2, S-3	Matt McFarland	F-3, S-3
Chris Koryciak	F-4	Tom Childes (Operation)	F-4
Robert Duby	F-4, S-4	Mike Glaskow (Lab)	F-1, S-3
Charles Yanta	F-3	Nicole Alexander (Lab)	F-3, S-4
Rodney Jackson	F-3, S-3	Mike Beckley (Maint)	F-4, S-4
Tim Bratton	F-4	Donald Echlin	F-4
Scott Dungee	F-4, S-4		

Distribution System Superintendent: Robert Bincsik - S-1
Organizational Chart: See Appendix A

Wholesale Customers:	Population
Genesee County Drain Commissioner:	153,000 - combined GCDC wholesale and retail
City of Flint:	102,434 2010 Census
Total Population Served:	255,434

Percent Metered: 100%
Percent Unaccounted: 68% (from 2011 reliability study)

V. ...er System Construction Features & Dates:

The Flint WTP is a 36 MGD water treatment facility that has recently undergone a $45 million rehabilitation project. The project allows the facility to serve as an emergency stand-by treatment plant. The WTP is not operated on a routine basis however, the facility can be placed into operation in the event that the single 72-inch transmission main (pipeline) serving Flint from the Detroit Water & Sewerage Department (DWSD) were to fail.

The city of Flint purchases bulk water from the DWSD and distributes it to the city. Portions of the treatment plant including Control Station No. 2, Dort Reservoir, and Pump Station No. 4 play a vital role in daily operation and transmittal of purchased water from DWSD to much of Flint's service area. Below is a summary of the most recent construction features at the Flint WTP. Copies of the construction permits for Segments 1-4 can be referenced in **Appendix B.**

1. Segment 1 WTP Rehab - Construction of new rapid mix and flocculation basins, interconnect structure, SCADA control, and boiler facility. 1999 - 2000
2. Segment 2 WTP Rehab - Construction of new primary clarifier structure 2000 - 2001
3. Segment 3 WTP Rehab - Construction of west solids contact unit for lime softening, 2 new lime slakers, four rapid gravity sand filters, new chemical feed room, two new intake traveling screens 2001 - 2002
4. Segment 4 WTP Rehab - construction of east solids contact unit for lime softening, 2 additional lime slakers, eight rapid sand gravity filters, and one ozone treatment facility. 2003 - 2005
5. Intermediate chlorination installed at primary clarifier outlet (used in Nov. 2010 WTP test run).
6. Temporary de-chlor system (drip system) installed in 2009. Used in 2009 pipeline emergency. The de-chlor system now uses calibrated LMI feed pumps and is located in the NW corner of Pump Station No. 4.

Is Vulnerability Assessment Available for review? Yes, available at the WTP
Is Emergency Response Plan Available for review? Yes, available at the WTP

Plant Personnel/Construction/Security comments:
Security provisions include: perimeter fencing, a guard building at the main entrance, surveillance cameras at the front desk and guard building, and intrusion alarms within the ozone building. The WTP is staffed during normal working hours, all building entrances are unlocked, and the main gate is open. After 4pm, staffing is limited to operations personnel, all entrances are locked, and the main entrance gate is closed.

City of Flint Pumpage Data (Million Gallons Per Day)

Year	MDD	ADD	AD - Max mo	min. day	G/C/D
2001	26.03	18.13			145
2002	26.44	18.45	21.8	15.65	148
2003	30.05	19.9	25.22	16.59	159
2004	23.06	16.86	19.89	15.33	135
2005	23.79	17.64		11.56	141
2006	24.55	16.19		13.28	130
2007	26.38	17.02		12.53	159
2008	18.66	15.23		10.06	145
2009	21.57	14.03		9.28	136
2010	17.5	14.09		10.95	138
2011	20.41	13.92		9.01	136

...TER TREATMENT PLANT See **Appendix C** for a WTP flow diagram

Plant Design Capacity: 36 MGD
State Rated Capacity: To be determined

F Metering	Y/N	Type/Location
Raw Water:	Yes	Ultrasonic flowmeter after risewell in piping below lime feed rm.
Finished Water:	Yes	Venturi meter at the end of the filter confl. piping in filter gallery.
Backwash Water:	Yes	Pressure differential meter (similar to an ultrasonic meter) on main washwater line with readouts on each filter console and totalizer on SCADA.
Plant Water:	Y&N	Plant domestic water is not metered. Process water is metered at each process point.

Total Treated Water Storage 3.0 MG

Treatment Plant

Clearwell: None

Ground Storage: 3.0 MGAL Well - prior to P. S. 4 (also functions as clearwell & dist. storage)

Distribution System

Elevated Storage: 2.0 MGAL at WTP

Dort Reservoir: 20 MGAL ground storage at WTP

Cedar St. Res: 20 MGAL ground storage within distribution system

Westside Res: 12 MGAL ground storage within distribution system

Total (MG) 57.0 MGAL

Percent of Maximum Day: 190%

Emergency Supply/Interconnection:

Donaldson Road meter pit: westside of city via 12-inch connection

Orgould Station: station taken out of service however piping remains connected.

Others: Several other locations however, the interconnects are locked out.

Demand/Capacity/Storage Comments:

Flint purchases water from Detroit through a 120-inch transmission main from the Detroit Lake Huron WTP west to the Imlay Pump Station. From Imlay west, water is transmitted through the 72-inch pipeline. Water reaches the Flint WTP beginning at Control Station (CS) #2. C.S. 2 monitors incoming pressure, flow rate, turbidity, and chlorine residual. The control station is equipped with a 60-inch and 36-inch flow control valve. Flow to PS #4 via the 3 MG well is directed through the 36-inch valve. The 60-inch valve is normally kept closed. Adequate turn-over of water in the Dort reservoir is accomplished by throttling the 36-inch valve at C.S. 2 thus augmenting some of the flow around C.S. 2 and through the Dort reservoir.

The Dort reservoir can be filled only from the 72-inch pipeline. WTP would like to gain the ability to pump directly from the WTP to Dort then thru to P.S. 4 which would require a finished water pump station.

There were two pipeline emergencies in 2009 that resulted in WTP treating Flint River water and distributing it to the city. The first emergency involved repair of a break along a compound curve in Genesee Road. The line was taken down and welded. The WTP supplied the city water for approximately 2 days. A boil water advisory was issued as a precaution since plant tap bacteriological samples could not be collected while the WTP was filtering to waste to the Flint River (prior to switch-over). The second emergency involved repair at the same location; however, a new section of pipe was installed instead of welding. The WTP distributed water to the city for approximately 3 days during this repair. A temporary intermediate chlorination system and a de-chlor (drip-feed system) were set-up which allowed chlorinated water to pass thru the filters for plant tap monitoring and confirmation of acceptable bacteriological samples. These measures allowed the WTP to supply the city without having to issue a boil water advisory. Finally, the pipeline was taken out of service in 2012 to evaluate a potential repair and the WTP was placed into emergency operation. The city did not proceed with the repair at that time and the WTP did not distribute treated water.

WTP staff continue to conduct quarterly plant test runs. 4 test runs were conducted in 2009, followed by 3 in 2010, 3 in 2011, and 4 in 2012. Table 1 on the following page shows a summary of WQ data obtained during the WTP test runs since 2010.

TABLE 1 Test-Run: Water Quality

	Raw		Treated	
	Normal	Range	Normal	Range
Hardness, ppm	266	214 - 316	257	220 - 296
Turbidity, NTU	13	3.00 - 150	0.13	.07- 0.47
Color				
Alkalinity, ppm	210	146 - 257	155	41 - 208
Total Col, cts/100 ml	*	*	*	*
TOC, ppm				
Nitrate, ppm				
Fluoride, ppm	0.18	0.15 - 0.22	0.19	0.13 -0.21
TTHM, ppb				
HAA5, ppb				
pH	8.1	7.26 - 8.45	7.34	7.09-7.52

Monitoring Requirements: See Monitoring Schedule, **Appendix D**
Complete Chemical Analysis: See **Appendix E**
* See WTP Test-Run reports in **Appendix F.**

Comments:

The WTP filters are equipped with on-line continuous monitoring turbidimeters on each filter effluent line; however, plumbing changes were necessary since the WTP operates in filter to waste mode the majority of the time . Individual filter turbidities are obtained once every 4hrs with grab samples during each of the WTP test-runs. The WTP also has a combined filter effluent (CFE) turbidimeter, however, CFE monitoring cannot be conducted when the WTP operates in the filter to waste mode since the location of the turbidimeter is downstream of the filtered water discharge point.

Intake Facility

Name of Source:	Flint River
Source Capacity:	23 CFS (lowest 7-day mean flow 1933-1999)
Diameter of raw water intake pipe:	72-inch
Total Length	50 Ft
Intake/crib capacity:	36 MGD
Location (latitude/longitude):	43* 03.293 min N 83* 40.126 min W
Submergence:	4 Ft at 709 USGS (708 Ft - 710 Ft is typical range of river level elevation)
Entrance Velocity:	2.0 Ft/Sec at 36 MGD
Grating	2 1/2 inch x 1/2 inch at 1 1/2 inch on center bar racks
Zebra Mussel Control:	None
Historic Low Water Elevation:	NA - never less than 708 Ft USGS
Historic Low Water Flow:	NA - never less than 708 Ft USGS
Historic High Water Elevation	717 Ft USGS
Standby (Emergency) Intake?	None
Source Water Assess. Plan avail.?	Yes
Back flush provisions?	No

(.ments:
Water flows through the intake by gravity to the traveling screens. The old traveling screens were replaced with two new US Filter traveling screens during the first segment of the WTP rehabilitation project. The screens are cleaned during each WTP test-run. A pull-up door is opened and a collection trough is exposed. WTP staff spray debris out of the trough using plant service water. The debris are bagged and sent to the local landfill for disposal.

MDEQ Conclusions/Recommendations:

The city has addressed the concern of adequate submergence at maximum drawdown of the Hamilton Dam. The water level and available pool depth were investigated in early 2009 and it was determined that sufficient pool depth is available at the maximum drawdown mandated by the Dam Safety Unit (705.25 ft water elevation) to maintain rated capacity of the low-service pumps; however, pump cavitation occurred when the water elevation was lowered an additional 6-inches.

Pumps and Pump Locations

Purpose		Location	HP	Capacity	Type	Lubricant	Status	PM
Low Service:								
	#3	P.S. 4	250	30 MGD	HC	Yes	Op.	See comments
	#4	P.S. 4	200	25 MGD	HC	Yes	Op.	See comments
	#5	P.S. 4	150	20 MGD	HC -VFD	Yes	Op.	See comments
	#6	P.S. 4	125	15 MGD	HC - VFD	Yes	Op.	See comments
	Total Capacity			**90 MGD**				
	Firm Capacity			**60 MGD**				
High Service:								
	#1	P.S 4	800	20 MGD	HC	Yes	Inoperable	
	#2	P.S 4	1000	25 MGD	HC	Yes	Not used	
	#7	P.S 4	800	20 MGD	HC	Yes	Operable	
	#8	P.S 4	800	20 MGD	HC	Yes	Operable	
	#9	P.S 4		6 MGD	HC	Yes	Operable	
	Total Capacity			**46 MGD - See MDEQ Conclusions/Rec**				
	Firm			**26 MGD - See MDEQ Conclusions/Rec**				
Ferric Sludge:								
	#1	WTP base	9	350 GPM	HC	Yes	Operable	Yes
	#2	WTP base	9	350 GPM	HC	Yes	Operable	Yes
Lime Sludge:								
	#1	WTP base	15	230 GPM	PC	Yes	Operable	Yes
	#2	WTP base	15	230 GPM	PC	Yes	Not used	Yes

Filter Backwash: None
Reclaim: Yes, see Ozone section for further discussion
Sludge Disposal: Yes

Comments:

Low Service: A Low Tox Turbine oil is used to maintain each pump motor. The upper portion of the pump motor also requires grease. Pump operation is maintained by WTP staff once every two hours while in operation and routine maintenance is performed once a month. Pump suction is isolated by gate valves and pump discharge is isolated by butterfly valves and all of the valves have been exercised. All four pumps are operational however, Pumps #3 and #4 are not a good match for test run treatment rates. These pumps are used during treatment start-up (filling basins, etc.). Newer Allen Bradley switchgear (VFD controlled) is in place for Pumps #5 and #6 and these pumps are used during the plant test runs. Pumps #3 and #4 are controlled by original Westinghouse switchgear. The pump motors and switchgear are located on the main floor of Pump Station #4 and are not subject to flooding. The horizontal centrifugal pumps are located in the pump station sub-basement and are subject to flooding.

High Service: Low Tox Turbine oil is used to maintain the pump motor for pumps #1 and #2. Pumps 7, 8, and 9 are maintained with an Elmac 1263 high temperature grease. H.S. Pump #1 is burned out and cannot be operated. H.S. Pump #2's operating condition is unknown and this pump would be used only in an emergency situation. H.S. Pump #7 and #8 are in good operating condition and are throttled during emergency operation. H.S. Pump #9 has a lower capacity and the pump's main purpose is to recirculate water in the 3 MGAL Well. WTP staff are discussing with the city the possibility of replacing H.S. Pumps #1 and #2 with lower capacity VFD controlled pumps.

Sludge Pumps: These pumps are in good condition and are maintained on a regular basis. Both lime sludge pumps are in operating condition however, new pump controls are needed for Pump #2.

MDEQ Conclusions/Recommendations

LS Pumps #3 and #4 should be operated periodically between WTP test runs to ensure that the pumps and switchgear remain in operating condition. Eventually, it may be worthwhile to replace the switchgear in order to increase the flexibility of operation of the low service pump station.

Since H.S. Pump #1 is not operable and H.S. Pump #2 is for emergency use only, the total and firm pumping capacity of high service is limited to 46 MGD and 26 MGD respectively. The DEQ is comfortable with the total and firm capacity to meet Flint's water usage in the event of an emergency repair on the pipeline; however, the firm high service pumping capacity falls somewhat short in meeting the combined needs of Flint and Genesee County during an extended pipeline emergency.

The combined needs of Flint and Genesee County will soon be identified as the scope of the Karegnondi Water Authority (KWA) is finalized and Flint's long-term source of water is determined. These factors will determine the future use level of the high service pump station . When the outcome of Flint's long-term source of water and the KWA project are determined, the future use level of the pump station will need to be evaluated to determine the amount of high service pumping capacity and other station improvements that may be needed.

Electrical power for the WTP (low and high service pumping) is provided by a dual 46-KV primary electrical feed with automatic transfer, however the dual feed originates from the same switch yard. Although the WTP has two main substation transformers, the configuration will not address power issues that could occur with the generating utility or transmission grid. Additional provisions for stand-by power including on-site generation will need to be provided if the WTP becomes a full-time operating facility.

Treatment Facilities

Ozone Facility

Location: Immediately east of the main treatment plant - WTP II
Contact Basins: 3
Capacity: 12 MGD per contact basin
Ozone Generators: 2
O3 Concentration: 6%
O3 rate: 1300 Pounds/day per generator

Storage:

9000 gallon liquid oxygen 10 ft diameter double walled horizontal tank rated at 75 psi
N2: 540 gallon 5.5 ft diameter double walled vertical tank rated at 250 psi
O2 Vaporizer: 2 @ 12,000 scfh
Heaters: 2 @ 12,000 scfh to maintain minimum O2 temperatures

Diffusion System:

42 dome ceramic bonded fused alumina, fine bubble diffusers in each contractor basin (3 basins total or 126 diffusers)

Ozone Destruct System:
Sodium bi-sulfite feed system utilizing 3 LMI feed pumps each rated at 4.00 GPH @ 100 psi
An additional spare pump is provided for a total of 4 LMI pumps - C921-460S1.

Sodium bisulfite is stored as a 38% solution in 55-gallon barrels from PVS Knollwood. The compound is gravity fed to a calibration chamber prior to the metering pumps.

2 off-gas thermal-catalytic destruction units with a design capacity to reduce the O3 concentration of the off-gas flow to less than 0.05 ppm. Each blower is rated at 306 scfm.

The ozone facility consists of 3 concrete contactor basins with each basin composed of one diffusion chamber divided into 2 cells by means of overflow and underflow baffle walls. Raw water is fed into the ozone building's pre-sedimentation chamber through a 48-inch main from the low service pumps. Three 36-inch influent piping to each contactor basin from the pre-sedimentation basin are provided. Ozone is fed into the first cell through the diffusion system located at the floor in a counter-current fashion. Ozone is fed into the second cell through a second diffusion system in a co-current fashion. The maximum flow is 1.5 scfm per diffuser. Each contact basin is metered (both rate of flow and totalizer).

Each of the three contact basins contain six contact chambers following the diffusion chamber. The size and contact times at 12 MGD for each portion of the contactor basin (diffusion cells and contact chambers) are summarized below for CT calculation purposes:

Diffusion Chamber Cell 1 - 805 Cu. Ft., 0.72 minutes
Diffusion Chamber Cell 2 - 805 Cu. Ft., 0.72 minutes
Contact Chamber, Compartment 1 - 1964 Cu. Ft., 1.76 minutes
Contact Chamber, Compartment 2 - 3592 Cu. Ft., 3.22 minutes
Contact Chamber, Compartment 3 - 3592 Cu. Ft., 3.22 minutes
Contact Chamber, Compartment 4 - 3692 Cu. Ft., 3.22 minutes
Contact Chamber, Compartment 5 - 3692 Cu. Ft., 3.22 minutes
Contact Chamber, Compartment 6 - 2760 Cu. Ft., 2.48 minutes

Total volume of contactor basin: 20,702 Cu. Ft
Hydraulic Retention time: 18.56 min @ 12 MGD
Baffle factor: 0.7
T_{10}: 12.97 minutes
Initial O3 concentration: 0.7 ppm Final O3 concentration prior to destruct: 0.0 ppm

Reference contactor basin diagram - **Appendix G**

Each contactor basin is provided with 3 sampling points for monitoring of residual ozone for CT determination. The sampling points are located at the end of diffusion chamber, end of contact chamber 3, and the end of contact chamber 6.

The capability to reclaim filter backwash water is provided at the pre-sedimentation basin in the ozone building. Three backwash water reclaim pumps are located on the bottom floor of the ozone building adjacent to the pre-sedimentation basin. 12-inch piping from the backwash storage retention basin at Treatment Plant 1 is piped to one of three horizontal centrifugal pumps. Each of the 10 hp pumps can pump reclaim water to the pre-sedimentation basin. The backwash water reclaim system is not used during WTP test runs or during emergency production. The backwash reclaim system may be used if the WTP is placed into routine production.

ocess water to the ozone building is protected by a Watts 10-inch reduced pressure zone (RPZ) backflow preventer. Domestic water to the ozone building is provided by a 2-inch line just upstream of the RPZ.

Two 3.5ft X 3.5ft access hatches are provided at the top of each contactor basin above the diffusers. Each contactor basin also has one 30-inch diameter flanged hatch located at the bottom of the basin.

Much of the ozone facility's control system has been replaced and/or reprogrammed. Fin-Tek is the new contractor that provides assistance in ozone control issues. The work has resolved most of the start-up issues with the ozone facility.

MDEQ Conclusions/Recommendations:

WTP test runs show that ozone residuals cannot be maintained through the contact chamber; thus, limiting the CT potential. An additional sampling point should be added at the end of the diffusion chamber Cell 1 which will allow for a slight increase in the CT determination. The ozone generators are due for routine cleaning. The generators should also be set on a routine cleaning schedule as per the manufacturer's

RAPID MIX

Number of Units: 2
Volume of each unit: 5.5ft X 5.5ft X 16 ft - 3,620 gallons
Detention Time at rated capacity: Approximately 17 seconds at 18 MGD
Mixer Type: 3.7 HP Lightnin mechanical mixer
Velocity Gradient (G): G-value of 380/sec.
Mixing rate: 4:1 variable speed control
Condition of equipment: Good - new in 2000
nicals added: Ferric chloride

Comment on Rapid Mix:
The rapid mix basins are designated as the east basin or west basin and each basin can be isolated with a gate valve. Ferric chloride is fed from the chemical feed room to a calibration chamber and the coagulant is applied directly into the rapid mix basin. Each mixer is maintained during and after each test-run or equipment shake-down. Each motor is lubricated with Low Tox turbine oil.

FLOCCULATION BASINS

Number of Units: 2
Volume of each unit: 44ft X 80.3ft X 16 ft - 422,853 gallons each
Detention time at rated capacity: 34 min
Type of Units: 3-stage flocculation unit
Inlet design: 36-inch piping
Is mechanical flocculator used? Yes, fifteen 1.5 HP Series 10 Lightnin impeller mixers w. variable speed are provided.
Condition of equipment: Good, new in 2000
Is C*T available? Not applicable, no disinfectant residual is carried through the flocculator.
Baffles: Each flocculator is separated into 3 stages with baffle walls in between each stage.
Preventive Maintenance: Monthly maintenance is performed on each of the 15 mixers in each flocculator.
Comments:

Each flocculation basin is divided into 3 stages with 11.3 minutes of detention time per stage at 18 MGD and a flow-through velocity of 1.3 fpm. The main influent is a 36-inch main influent line with five 30-inch outlets. Each stage has five vertical mixers set for a specific mixing speed. The mixers have an AFD 10:1 variable speed control with a G-value ranging from 30/sec to 80/sec. The outlet piping consists of five 36-inch outlets that manifold to a 54-inch pipe prior to entering primary sedimentation. The flocculation basins meet the construction standards establsihed in Section 4.2.3 of ommended StandardsFor Water Works.

The flocculation basins and equipment were installed in 2000 and are in good condition. Problems have occurred in the flocculator control room with the digital read-outs failing to function due to the moisture in the air. WTP staff utilize portable hand-held units to monitor and control mixing within the flocculation basins. The original digital equipment has been removed since they are no longer available from the manufacturer.

M[illegible]Q Conclusions/Recommendations:

Although the original equipment cannot be replaced, moisture needs to be minimized in the control room in

Primary Clarifier Structure

Number of Units: Plate settlers - one unit containing three separate plate settler basins.
Type of units: Plate settlers - 50 sqft per plate
Volume of Each Unit: Three basins each at 39.5ft X 82 ft X 17.5 ft - 56,682 cu. ft. each
Plate Settlers: Each basin is equipped with 4 rows of plate settlers - 1216 plates or 60,800 sqft plate area per basin
Detention Time at rated capacity: 51 minutes at 12 MGD - or plate loading rate of 0.14 gpm/sqft
Inlet Design: Two 48 X 48-inch inlet channels
Baffles: Not applicable - no disinfectant residual
Outlet Weir: 4 outlet troughs (8 launders) in each basin 70 ft length or 560 LF of total weir length - 21,400 gpd/Ft
Outlet Design: Four 24 X 24-inch outlet channels,
Baffling Factor: Not applicable - no disinfectant residual
Overflow: 20-inch weir from the effluent channel and a 30-inch outlet that drains to a storm sewer.
Drains: Yes
Curbing: 6-inch curbing
Cleaning Procedure: Spyder sludge collection system consisting of zoned grid of parallel piping under suction
Sludge Disposal: 2 pumps rated at 350 gpm. Sludge is pumped to holding basin for discharge to the sanitary sewer.
Physical Condition: good
Effluent turbidity: 0.75 NTUs - based upon the 2009 emergency WTP operation & test-run reports through 2012.
Is C*T available? Not applicable, intermediate disinfection (chlorination) is provided at the plate settler effluent.

Comments:
Outlet piping from the flocculation basins manifolds into one 54-inch pipe. The 54-inch pipe splits into two 48 X 48-inch influents. The first influent pipe is for the existing primary clarifier and the second influent pipe remains for a future clarifier. The rate of flow over the outlet weir slighly exceeds Recommended Standards For Water Works of 20,000 gpd/ft of weir; however the standard is based on straight weir length. The outlet weir at the WTP is a V-notch design with effectively increases the total straight length. Equivalent effective settling has also been demonstrated in WTP test runs at the rated capacity of the basin.

The sludge collection system is designed for automatic operation, however, the float controls are not enabled since they do not function correctly. The sludge collection system is activated manually during each operator shift as part of routine operation.

Intermediate chlorination was added at the plate settler outlet - see Chemical feed section for more detailed discussion.

Softening with Lime Feed - Softening Not Practiced

Number of Units: 2 - East & West
Type of Units: Solids Contact Unit
Volume of Each Unit: 1.28 mgal
Rated Capacity: 17 mgd - West & 19 mgd - East
Upflow Rates: 1.47 gpm/sf - West & 1.64 gpm/sf -East
Detention Time at rated capacity: 118 min - West & 114 min - East
Inlet Design: 36-inch inlet pipe entering central circulation drum
Baffles: NA
Outlet Design: 20 effluent launders - 31.5 ft long - 10.5 gpm/ft weir loading - East unit
[illegible]ling Factor: 0.5 9.4 gpm/ft weir loading - West unit
Overflow: Piping to filters
Drains:
Two 6-inch drains, one at bottom of sludge hopper and the other at the bottom of the solids contact unit near the sidewall

Curbing:
4 inch kickplates along the walkway and center platform. A 36-inch safety rail is also provided for the walkway, center column, and the outer perimeter of each contact unit. Kick plates are also provided around perimeter of the unit and access is provided to each launder.
Sludge Disposal:
Two sludge rotating scraper arms direct sludge to the center sludge hopper. Sludge from the hopper is directed to the sludge pumps.
Physical Condition: Both solids contact units are new and in good condition.

C*T: See **Appendix H**

Rapid Mix Area:
Mixing Unit: One marine propeller in central circulation drum with variable speed.
Chemicals added to rapid mix area: Lime and provisions for polymer and soda ash
Velocity Gradient (G) if available? Mixer provided with max. tip speed of 13.2 fpm (VFD controlled in a 6:1 range)

Flocculation Area: Upper zone of central reaction well
Short Circuiting: The unit is designed with baffling and short circuiting has not been noted.
Inlet design: Radial outlet ports from topside of central circulation drum
Is mechanical flocculator used? No
Condition of equipment: New in 2004
Baffles: Yes

Comments:

Each solids contact unit has two 4-inch lines to convey lime slurry to the central circulation drum. A 3/4" line conveys polymer to the mixing chamber. The chemical feed lines are fastened to the walkway and connected to the 36-inch inlet pipe. The lime application point is on the 36-inch inlet pipe approximately 15 feet before the central circulation drum. The polymer application point is in the 36-inlet pipe approximately 20 feet prior to the central circulation drum. The solids contact unit is constructed in accordance to Recommended Standards for Water Works for softening.

Cleaning Procedure: Each unit is drained to the bottom level through the side drain. The remaining water is pumped out from the unit and the sludge is hosed into the center sludge sump. 6-inch piping connects the sump to the sludge pumps by which the sludge is sent to the Bray Road lagoon. Water from the unit is drained to the sanitary sewer via the 6-inch drain. The southeast lime bin silo experienced problems associated with moisture build-up.

Preventive maintenance: The pump motors and scraper arm gears are greased periodically. The scrapers, skirting, and the condition of other mechanical equipment are also checked.

Effluent turbidity, average/range: 0.6 - 0.7 NTUs. Although softening is not practiced an additional 0.05 - 0.1 NTUs of turbidity settles out in softening clarifier basins.

MDEQ Conclusions/Recommendations:

Both clarifiers were constructed in accordance with 10-state standards and WTP staff attempted to operate the contact units during the 2006 and 2007 test-runs; however, further lime softening has not been practiced. The inability to soften is due to the time needed for sludge blanket formation and stabilization verses the time allotted for routine WTP test-runs (one week). Also, most pipeline emergencies require the WTP to be capable of distributing potable water within 24-36 hours of plant start-up. We agree that it is not practical to attempt softening given the treatment plant's current operating role; however, if WTP operators wish to become proficient at softening, the duration of routine test runs will need to be increased. The need for future softening; however, will depend on the city's long-term source of drinking water.

F arbonation:

Type: Pressurized solution feed system
Number of Units: Two contactor basins - 50ft X 10.6ft X 14ft - 55,800 gal each with baffling
Detention Time: 4.5 minutes at 18 mgd
Storage: Liquid CO2 storage - one 34-ton storage tank - Tomco model WT34CA
CO2 Feeder: Two feeders each rated at 325 lbs/hr
Solution Diffuser: Two multiport diffusers to input CO2 into the feed water stream

Since lime softening is not practiced, the recarbonation system is not used.

FILTRATION

Type of filter: Declining rate
Number and Area of Filters: 12 @ 700 sqft each
Design Filtration Rate: 3.0 gpm/sqft - 3 mgd per filter - 36 mgd total filter capacity
Approved Filtration Rate: 3.0 gpm/sqft
Maximum Rate Experienced: 18.2 MGD rate for 1 hour during Sept. 2009 emerg. Op.
Maximum filtration rate: 4.0 gpm/sqft - filter #8 and #9 for 1 hour during Sept 2009 emerg. Op.
Is flow equalized through all filters? Yes
Rate of flow device:
Flow control valves are provided on the filter effluent piping of each filter - % open - close.
The flow control valves consist of butterfly valves controlled by an electric operator.

r to waste:
Filters 1 -4: Filters 1 & 3 share a common drain. Filters 2 & 4 share a common drain.
This common drain limits the filter to waste capacity for Filters 1 through 4.

Filters 5-12: The filter to waste lines from each individual filter discharges to a common drain and this piping configuration does not pose a hydraulic limitation.

Filter hours: Average: Maximum : Minimum:

Filter hours are not available since the WTP test run (one week) concludes prior to filters needing backwash. Filter run hours will become available only if the WTP assumes fulltime operation or test runs of longer duration are performed.

Filter Media - Filters No. #1 - 12 Mixed Media filters

	Anthracite	Sand
Depth - inches	18	12
Effective size (mm):	1 - 1.2	0.45 - 0.55
Uniformity coefficient	<1.5	<1.6

Date Last Rebuilt or Checked: The filters were installed in 2005 and 2006. Each filter was backwashed 3 or 4 times following installation and the depth of the sand and anthracite was measured.
Underdrain Type: General Filter Multi Concrete II -ABS plastic underdrain forms w. plastic media retaining nozzles
C bing: 4-inch
r Overflow: None
Surface Wash: None
Depth of Water Above Media: 7.92 feet
Filter Performance Records: - yes, records have been established

Turbidimeters

Is re continuous turbidimeter for each filter? Yes	Calibration frequency: See comment
Is there continuous turbidimeter for the applied? No, grab samples	Calibration frequency: See comment
Is there continuous turbidimeter for confluence? Yes, not is use	Calibration frequency: See comment
Turbidimeter used for combined compliance: NA	Calibration frequency: See comment

Comments:
Continuous turbidimeters are provided for each filter and for filter confluence. Plumbing changes were completed in order to allow the individual filter turbidimeters to function properly in the filter to waste mode. The continuous turbidimeters have been in operation and filter turbidities are monitored during WTP test runs. The filter confluence turbidimeter also monitored turbidity during the 2009 emergency plant runs. During routine WTP test runs none of the filtered water reaches this turbidimeter since the filters are in filter to waste mode.

WTP plant tap maximum turbidity during the Sept 2009 emergency operation was 0.16 NTUs based on lab grab samples collected every 3 hours. The maximum individual filter turbidity was 0.19 NTUs from Filter #9 based on 3 hour grab samples. The maximum individual filter turbidity based on the on-line continuous turbidmeters was less than the turbidity reported from the grab samples from all operating filters during the September 2009 emergency operation.

Backwash: Combined air-water backwash system

Average run length time of filter: NA - WTP test runs are not long enough to determine filter run times.
Criteria for backwash: End of plant test-run, head-loss for longer runs and turbidity limit.

Source of backwash water:
[distribution system - two feeds labeled as east and west wash water supply
The east wash water supply is fed from a 42-inch line with a flow range between 3,500 gpm and 12,000 gpm.
The west wash water supply is fed from a 24-inch line (hydraulic limitations - 8-inch bottleneck in valve vault)
The wash water supply lines are equipped with a 16-inch PRV suitable for reducing the pressure from 80 psi to 10 psi at the stated flow range. The PRV consists of a pilot controlled globe valve.

Average duration of backwash: 15 minutes
Maximum duration of backwash: 15 minutes
Average backwash flow, gpm: 6300 gpm
Maximum backwash flow, gpm: 9800 gpm
Maximum backwash rate - variable rate 5 - 20 gpm/sqft
Airwash rate: 3 scfm/sqft - 2 blowers each with 1000 cfm at 5.5 psig capacity

The filters are backwashed in the following stages:

Stage 1 - Ramp-up backwash water flow rate from 0 to 2000 gpm - no air, 1.5 minutes duration
Stage 2 - Ramp-up backwash water flow rate from 2000 to 6300 gpm - with air - 1.0 minute duration
Stage 3 - Maintain backwash water flow rate at 6300 gpm - with air - 8.0 minutes duration
Stage 4 - Ramp-up backwash water flow rate from 6300 gpm to 9800 gpm - no air - 2.0 minutes duration
Stage 5 - Maintain backwash water flow rate at 9800 gpm - no air - 2.5 minutes duration
Stage 6 - Ramp down backwash water flow rate from 9800 gpm to 0 gpm

Backwash water disposal:
An existing backwash equalization basin between WTP No. 1 and the ozone building stores backwash water. The retained backwash water can either be directed to the head of the ozone treatment or discharged to the sanitary [er.

Is bed expansion achieved? Yes, bed expansion was tested during equipment shakedown
Is there loss of media during backwash? A small amount of media was lost (mostly fines) after initial installation
WTP staff are planning to core the filter media within the next one or two years as part of filter maintenance.

F · to Waste & Backwash disposal - Unique to Flint WTP

During WTP test runs, production water is filtered to waste and discharged to the Flint River in accordance NPDES General Permit MIG640000 - Certificate of Coverage MIG640053. The COC was renewed on April 1, 2010 and expires on April 1, 2015.

Filter to waste water exits the south side of the WTP facility through a 36-inch line that is connected to an intercept box. The box is divided into two sections by a slide gate valve. During the filter to waste mode, the slide gate valve is open and filter to waste water flows through the intercept box and to a discharge pipe for discharge to the Flint River. After completion of a routine test run, the WTP is shut down and the filters are backwashed. Filtered backwash water is directed from the intercept box to the wastewater transfer pump station. The backwash water is pumped from this station to a backwash retention basin through a 14-inch line. Backwash water is stored in this basin and can either be discharged to the sanitary sewer or recycled to the front of the ozone treatment process. The intercept box design does not allow filter to waste and filter backwashing to be performed simultaneously.

Wastewater flow schematic: Reference Appendix I

Location of recycled stream into plant flow: Pre-sedimentation basin at the ozonation facility.
Is treatment/equalization provided prior to recycling? Yes
If yes:

Type of treatment: Equalization (storage) of backwash water
Volume of treatment/equalization unit: 820,000 gallons (approx. 4 backwash volumes)
Frequency of recycle stream from unit: Backwash water is not recycled at this time, instead the backwash is discharged to the sanitary sewer through a 10-inch drain and pump.
Chemical used, if any: None
Frequency of solids removal:

Associated problems with filters:

Mudballs - No
Air Binding - No
Cementing - No
Gravel Mounding - No
Media Loss - No
Adequate Backwash Rate - No
Cracking - No
Media Growth - No
Media Attrition - No
Bacteria Growth - No
Uniform Backwash - No
Mudballs - No

Comments:
The filters were installed in 2005 and 2006 as part of the WTP rehabilitation project. The filter electrical controls have required repairs due to a lack of routine operation. Piping to allow for filter monitoring including turbidity, flow rate, and head loss were re-plumbed to allow monitoring of these processes during the filter to waste mode. The monitoring equipment was also re-calibrated. Combined filter effluent turbidity and total flow rate cannot be monitored unless the WTP is sending filter effluent to the 3 mgal clearwell under emergency operation.

Each filter is disinfected in accordance with the AWWA standard for filter disinfection prior to each WTP test-run. Each filter is also backwashed three or four times following completion of each WTP test-run.

MDEQ Conclusions/Recommendations:

WTP operators have gained considerable experience in operation and maintenance of the WTP filters through ntinued WTP test runs and emergency operation. The WTP filters demonstrated their ability to distribute water meeting the turbidity standard during both of the 2009 emergency operations. Additional experience including determination of filter run times; however, are not possible given the short duration of routine test runs. Longer WTP test runs (10 days or more) would need to be performed to determine filter run times and to become familiar in conducting routine filter backwashes while the WTP is producing water. The co-mingling of treated water from the Flint River with water purchased from DWSD; however is not allowed by the DWSD;

thus, it is also not possible to perform filter backwashes while the WTP is producing water given the ıstraints with the filter to waste/backwash discharge system. WTP operator must temporarily stop treating ..ater in order to backwash the filters.

The WTP has two sources of backwash water (east wash water supply and west wash water supply). The west wash waster supply is provided from a 24-inch main immediately west of the WTP. The ability of the west wash water supply is limited by an existing 8-inch bottleneck within an existing valve vault. This bottleneck needs to be eliminated in order to increase the capacity of the west wash water supply.

WTP staff are planning to core the filter media within the next year or two as part of establishing a routine filter maintenance program. We encourage WTP operators to establish an on-going filter maintenance program that includes filter coring. Other important filter maintenance activities should also be included, such as; rodding, raking, and excavation. These types of activities are typically practiced at other operating WTPs.

PLANT TREATED WATER STORAGE/CLEARWELL (3 MGAL Well)

Location: Immediately south of Pump Station No. 4
Size: 3.0 mgal
Percent above grade: Totally buried, however top portion is mounded ....less than 20% above grade
Low water level: 11 ft with alarm, 14 ft for high alarm, 15 ft to top - 3 ft operating range
Isolation capabilities: The reservoir can be isolated with slide gate valves.
Vents: Three man-hole vents
Reservoir Baffling: middle baffle wall
Drains: Yes via high service pumping, then portable pump is used to remove remaining water.
Overflow: yes - at 15.5 ft
Access Hatches: three 36-inch circular hatches
Alarms: none, each access hatch is locked
Last Inspection: 1997
C*T credit: See **Appendix H.**

Comments on treated water storage/clearwell:
The reservoir can be isolated with existing slide gate valves. Water can be pumped from the Dort reservoir with the 3 MGAL well out of service. The reservoir is equipped with an internal overflow weir and drain at an elevation of 720 feet. The reservoir also has three manhole vents.

MDEQ Conclusions/Recommendations:

The 3 MGAL Well is due for a routine inspection. The integrity of the concrete base around each of the manhole vents needs to be verified. Any repairs that are needed should be completed at the time of the inspection or shortly after.

CHEMICAL FEED

CHLORINE

Chemical supplied: Gas chlorination, Tablet feeder
UL/NSF approved? Yes
Standard 60 max dose:
Supplier: Alexander Chemical Co.

Chlorine Feed Points:

1) Gas feed system for post CL2 - small junction box prior to 3 MGAL clearwell
2) Tablet feed system for intermediate CL2 - Plate settler effluent

GAS FEED SYSTEM:

Chlorine Evaporators:

Two Series 50-200 liquid chlorine evaporators. The chlorine evaporators are needed if the chlorine feed rate exceeds 400 lbs/day.

Chlorinators

Type of Feeders: Five Wallace & Tierman V-notch feeders
Location of vacuum regulators: In the first chlorine storage room

1) WT maximum feed rate: 2000 lbs/day
2) WT maximum feed rate: 2000 lbs/day
3) WT maximum feed rate: 2000 lbs/day
4) WT maximum feed rate: 500 lbs/day
5) WT maximum feed rate: 500 lbs/day

Chlorine Feed Dosage Determination:
Post Chlorination is not practiced except during emergency operation since the feedpoint is located at the 3 mgal well which also transmits purchased water from Detroit. Based on frequent laboratory bench tests and emergency operation in 2009, WTP operators have determined the chlorine demand through the treatment process to assure sufficient [illegible]t tap residuals during emergency operation.

Intermediate CL2: Liquid chlorine applied ranges between 3.0 - 4.0 ppm.
3 Mgal Well: Gas CL2 application approximately 1.0 ppm.

Chlorine Room Description:
The chlorine room is located in the NE section of P.S. #4 and consists of two separate rooms. The first room contains the chlorine cylinders, liquid chlorine evaporators, and vacuum regulators. The second room contains the chlorine feeders.

Scales: 2 weigh scales 0 - 8000 lbs are provided. Each scale can weigh two cylinders at a time.

Minimum days of storage:
One 1-ton cylinder is set-up and available for use; however, no more than 1500 pounds of gas chlorine is stored in order to meet process safety management requirements. Additional gas chlorine is available from the waste water treatment plant on short notice.

Gas Chlorine Safety Features/Summary: (Y/N)
NSF Approved - Yes
Air Pack - Yes
Respirators - No - fire dept. responds to CL2 gas leak
Chlorine Leak Alarm - Yes - 0.03 ppm
[illegible]k Detection Bottle - Yes
[illegible]nder Restraint - cylinders are cradled
Doors Open Outward - Yes
Heater - Yes
Window - Yes - one for each room
Scales - Yes
Panic Hardware - One first door, none on door to CL2 feed room
1st Responders - Yes
Haz-Mat Team - Yes - Genesee County
Inside Access - Yes - via P.S. #4, door sweep not sealed well
Outside Access - Yes
Repair Kit - Yes
Ventilation - Yes
Air Supply - Yes
Fan Switches -Yes, located on wall outside the chlorine sto. rm.

:ments:
Make-up water for the chlorine feed system comes from plant service water. All five chlorinators plant service water is supplied from the city distribution system and has full protection.

All five chlorinators share a single gas vacuum manifold to the raw water and finished water feed points. The cross connection between the low service pump discharge and the 3 MGAL reservoir through the gas vacuum piping has been physically separated. Make-up water to each ejector is plant service water also has full protection.

WTP staff operated the gas chlorine feed equipment during both emergency plant runs in 2009. Intermediate chlorination was installed in 2010 and placed into service in the November 2010 routine test run. Intermediate chlorination reduces the amount of chlorination needed at the 3 Mgal well (post chlorination).

MDEQ Conclusions/Recommendations

Although the local fire department will repond to gas chlorine leaks, air-pack respirators should also be available for WTP operators. Also, the interior entrance door sweep to the chlorine gas storage room needs to be properly sealed in order to reduce the possibility of an accidential gas release from spreading to the rest of Pump Station No. 4.

Intermediate Chlorination: (Tablet Feed System)

Two skid-mounted Constant Chlor Chlorinator units (Model MG-22) are provided at the plate settler effluent utilizing calcium hypochlorite tablets. Each unit's feed capacity is 384 LBs of calcium hypochlorite per day or 250 Lb/day avail CL2. Chlorine tablets are loaded into a briquette hopper and the tablets are dissolved by a spay system using plant service water. The dissolved calcium hypochlorite creates a 1.7% liquid CL2 solution. The chlorine solution is pumped the treatment flow stream with an LMI Series G (115 GPH) pump at an application rate ranging between 3.0 - 4.0 ppm. The chlorine solution is discharged into an open channel flow leaving the plate settler clarifiers.

Ferric Chloride:

Chemical supplied: 39% ferric chloride
UL/NSF approved? Yes
Standard 60 max dose:
Chemical feed point: Rapid mix
Supplier: PVS Knollwood

Chemical feeders:

	model	max feed rate	min feed rate
1	0.5 HP GE HC pump	2500 ml/min	18 ml/min
2	0.5 HP GE HC pump	2500 ml/min	18 ml/min
3	0.5 HP GE HC pump	2500 ml/min	18 ml/min

Chemical feed dosage determination: Jar-testing
Ferric Dosage Calculation: Ferric is pumped and timed through a graduated cylinder - ml/min
Feeder calibration frequency:
Scales? Side-read strip and sight glass on the bulk storage tanks, ultrasonic level device are also provided on all six tanks.

Chemical Storage: Three bulk storage tanks and three day tanks are provided.

storage: Three 6,500 gallon tanks are located in the treatment plant's train shed at the west end of the facility and ferric chloride is piped by gravity to three 2,000 gallon day tanks in the WTP basement. Each of the three tanks have a common 4-inch overflow and 8-inch vent. A sight glass is provided on the side of each tank for level determination. Each tank also has a level sensing system.

Minimum Days of Storage: 27 days

FEED RATE: Approx. 800 lbs/day during WTP test-runs. (based on the emergency operations in 2009)
FeCL3 Dosage: Approx. 45.0 mg/l - with range of 25.4 mg/l to 82.6 mg/l depending on raw water turbidity
Ferric Dosage: Approx. 15.0 mg/l - with range of 8.7 mg/l to 28.4 mg/l

Transfer pumps: None - 2-inch gravity piping from the bulk storage tanks to the day tanks with electrically actuated valves allows for transfer of ferric chloride to the day tanks.

Day tank: Three 2000 gallon tanks located in basement NE and below west softening basin
Each day tank is equipped with a level sensing system

Spill protection: The bulk storage tanks are dual walled design. The day tanks are contained within a a four foot containment wall.

Piping identification: The ferric piping is color coded accordingly.

Overfeed protection: None

Ferric Comments:
Three ferric feed pumps are provided and the pumps are located within the containment area with the day tanks. Each pump is piped to take suction from its own day tank, however, all three pumps and day tanks are piped and valved such that each pump has the capability to draw off any one of the three day tanks. The feed rate from each pump is adjusted by turning a calibrated screw from between a 0 and 100% setting. Each pump discharges ferric chloride to either the east or west rapid mix basin.

ontrol system for filling the bulk storage tank and transfer to the day tanks is in place. The system consists of level sensors and electrical control valves that controls filling of the bulk storage tank and transfer rates to the day tanks. **Overflow protection in the event of a control valve failure should be investigated and provided to prevent accidential discharge of ferric into the containment area.**

LIME FEED SYSTEM: **Not in use**

Type: Lime slaking system

Number of Units: Four

Capacity: 2000 lb/hr each

Storage: Four separate lime storage bins (NE, SE, NC, SC) are provided with 120 ton capacity in each bin.
Plant operators estimate a one week test run uses approximately 80 tons of lime.

Type of Lime: Quicklime - 90% pebble lime

Feed Point: Inlet pipe of solids contact unit

Feeder: Four Wallace & Tierman screw type volumetric feeder - capacity of 32 cuft/hr each.

Quicklime is fed continuously at one end of the slaking compartment. At the other end of the slaker, the paste is harged over a weir into a dilution chamber where a manually controlled continuous water spray converts the paste to a slurry of known concentration. Plant process water is used for make-up water to the slakers.
The lime feed system has not been used in WTP test runs since 2009 due to the time needed to establish a sludge blanket. Moisture problems have also been encountered in the lime storage silos which resulted in operational problems in earlier WTP test runs.

F ORIDE **Not in use**

Chemical supplied: System designed for hydrofluosilicic acid, however, the system is not in use nor is any acid stored.

UL/NSF - No chemical or supplier at this time.

Standard 60 max dose: To be determined upon chemical used.

Chemical feed point: Influent to softening clarifier

Supplier: None

Chemical feeders:

	model	max feed rate
1	LMI C721-71 FS	96 gal/day @ 100 psi
2	LMI C721-71 FS	96 gal/day @ 100 psi
3	LMI C721-71 FS	96 gal/day @ 100 psi

Chemical feed dosage determination: Not determined at this time.
Fluoride dosage calculation: A 1000 ml calibration chamber prior to each metering pump is provided.
Feeder calibration frequency: NA
Scales?
Chemical Storage: Two 55-gallon constant head tanks on 2nd floor of chemical feed room.

L storage: Five intermediate bulk storage tanks are provided, however, these tanks are not connected to the fluoride feed system. These tanks remain unopened on pallets in the WTP basement adjacent to the ferric feed area.

Minimum Days of Storage: See comment
Transfer pumps: See comment
Day tank: See comment
Spill protection: See comment
Piping identification:
Overfeed protection: The fluoride feed pumps are electrically interlocked with the low service pumps and the west-in channel flow meter

Comments:
The bulk storage portion of the fluoride feed system is not set-up at this time. When the installation is complete, hydrofluorosilicic acid will be drawn from bulk storage to each one of three 1000 ml calibration chambers then through one of the three metering pumps. The acid will be pumped to one of the 2 constant head tanks where water is added to the acid. The acid solution will then be fed from the constant head tank at an established rate to the influent of each softening unit.

Installation of the fluoride feed system has not been completed and the fluoride feed system has not been operated during routine WTP test-runs. Fluoridation is not practiced as part of routine WTP test runs or emergency operation. Fluoridation will be instituted when the WTP is placed into full time operation.

I culation Aid Polymer: **Not in use**

The feed system is installed however, it is not in use. Due to better than expected turbidity removal in the plate settlers this feed system is not expected to be used.

Chemical supplied: None
UL/NSF approved? NA
Standard 60 max dose: NA
Chemical feed point:
Supplier:

Chemical feeders:

	model	max feed rate
1	LMI C781-34	25 gal/hr @ 30 psi
2	LMI C781-34	25 gal/hr @ 30 psi
3	LMI C781-34	25 gal/hr @ 30 psi

Chemical feed dosage determination: NA
Polymer dosage calculation: NA
Feeder calibration frequency: NA
Scales? None
Chemical Storage: No chemicals are being stored
Bulk storage: None
M imum Days of Storage: NA
isfer pumps: NA
Day tank: NA
Spill protection: NA
Piping identification: NA
Overfeed protection: NA

Polymer Comments:
WTP staff may use the LMI feed pumps from the flocculation aid feed system for the softening aid feed system.

Softening Aid Polymer:

Chemical supplied: Claraflocc C-1600 Polyalluminum Chloride
UL/NSF approved - Yes
Standard 60 max dose:
Chemical feed point: Softening basin influent prior to the lime application point.
Supplier: Poly-Dyne

Chemical feeders:

	model	max feed rate	min feed rate
1	Poly-blend & LMI	2 gal/hr	
2	Poly-blend & LMI	2 gal/hr	
3	Poly-blend & LMI	2 gal/hr	

Chemical feed dosage determination: Jar testing
Polymer dosage calculation: see comments below
Feeder calibration frequency: Checked on every WTP test-run, will increase frequency to monthly

Scales? Each day tank has a graduated scale
(nical Storage: 55-gallon drum stored in room adjacent to the chemical feed room
Bulk storage: None
Minimum Days of Storage: Not determined
Spill protection: None
Piping identification: Yes
Overfeed protection: No

Polymer Comments:

The softening aid system is in use and is used more as a filtering aid.

Optimal polymer dosage is determined by adding different quantities of polymer to a liter of plate settler effluent. The optimal dosage of polymer is then determined in ml of polymer/ L (plate settler effluent). The feed system is configured to apply a specific amount of polymer in gph. For the calculation, the daily flow is changed from mgd to L/min. The determined dosage is then converted from ml/L to mL/min. The dosage determination is then converted from ml/min to gal/hr.

Flow gal/day X 1day/24hrs X 1hr/60min X 3.785L/gal

ml/min X 1L/1000ml X 1gal/3.785 L X 60 min/hr

Coagulation Aid Polymer: **Not in use**

Chemical supplied: Not in use
UL/NSF approved?
Standard 60 max dose:
Chemical feed point: Rapid mix
Supplier:

Chemical feeders:

	model	max feed rate	min feed rate
1	Poly-blend - LMI	2 gal/hr	
2	Poly-blend - LMI	2 gal/hr	
3	Poly-blend - LMI	2 gal/hr	

Chemical feed dosage determination: NA
Polymer dosage calculation:
Feeder calibration frequency: NA
Scales? None
Chemical Storage: No polymer stored
Bulk storage: None
Minimum Days of Storage: NA
Transfer pumps: None
Day tank: Removed
Spill protection: None
Piping identification: Yes
Overfeed protection: None

R ner Comments:
The coagulation aid feed system is also not in use. WTP staff do not intend to use the feed system at this time due to adequate coagulation without the polymer.

The coagulation aid feed system has been changed since its initial installation in Segment 3 of the rehabilitation project. The previous feed system was not able to pump the polymer due to its high viscosity. If coagulation aid is used in the future, the chemical will be supplied in a powder form and a solution will be prepared in an existing mechanical mixer located on the second floor above the chemical feed room. The coagulation aid solution will be prepared in a batch process by adding a set amount of powder to a set volume of water in the mixer and transferred from the mixer to the day tanks through 1 1/2-inch piping and a transfer pump. The polymer will then fed by gravity from the day tanks on the second floor to the metering pumps on the first floor for application into the rapid mix.

PLANT PIPING AND MISCELLANEOUS

		pipe diameter	length
Intake pipe:		72-inch	50 Ft
Low service discharge:		48-inch	Approx. 450 Ft to O3 Bldg.
Filter influent:		24-inch	In WTP
Filtered water effluent:		24-inch	In WTP
High service suction header:		36-inch	In P.S. 4
High service discharge:		36-inch	In P.S. 4
Backwash:		24-in (West)	In WTP
		42-in (East)	In WTP
S rface wash:		None	None
h water drain:		16-inch	In WTP
Intake backflush line:		None	None
Sludge drain:		8 to 12-inch	To Bray Rd Lagoon *
Plant service line:	(2 total)	24-inch from city	West side of WTP
		42-inch from city	East side of WTP
Do any roof drains or other drains enter treatment process?			No

Pipe Color Coding: In accordance to AWWA standards: Raw Water - Olive Green; Settled or Clarified - Aqua; Finished - Dark Blue; Backwash - Light Brown; Sludge - Dark Brown; Chlorine - Yellow

Plant Cross Connections and Common Walls:

Filter gullets? Yes
Common walls? Yes
Chlorine feed room? Chlorine is applied to filtered water - piping for raw water chlorination remains in place, however, raw water chlorination is not practiced.
Plant water RPZ? All plant service water comes off 6-inch line with a 6-inch RPZ
Chemical feed areas? Plant service water is utilized and full protection is provided.
Surface wash? No surface wash
Boiler? A Wilkins 1032213 RPZ is provided on the make-up waterline to the boiler and the device was recently tested.
Dishwasher? NA
Dehumidifier? Not connected to WTP water supply

Comment on Plant Piping Miscellaneous:
WTP process water is obtained from Flint's distribution system and is protected by a 6-inch RPZ backflow preventer. WTP domestic water is provided by a 2-inch line that tees off the 6-inch process water line just upstream of the RPZ backflow preventer. Plant domestic water serves the bathrooms, lunchroom, and laboratory.

A common wall exists between the filter gullet and filtered water as part of the original construction of the treatment plant. This concern was discussed during the rehabilitation project and any wall cracks that were discovered during the filter rehabilitation were repaired with a sealant. Also, two coats of sealant were applied on the wall separating the filter gullet and the filter box.

Reference **Appendix J** for a filter schematic.

PLANT METERING AND CONTROLS

Plant Domestic Metering: None
Raw Water Metering: Ultrasonic flowmeter after risewell in piping below lime feed room
Ozone System: Meter monitors flow to each ozone chamber
High Service Metering: Venturi meter - information sent to the WTP's SCADA system

Plant Controls:

- Chemical Feed
  - Gas chlorine - manually controlled at Pump Station No. 4. Continuous chlorine monitoring is performed at P.S. #4. The equipment is located at the high service pump discharge.
  - Tablet CL2 - manually controlled at plate settler effluent
  - Ferric - at WTP
  - Fluoride - not provided at this time
  - Chemical transfer pumps: manual with auto-shutoff
- Filters - manual control with status monitoring from SCADA
- Filter Backwash - BW is initiated manually, the BW stages can be manual or automatic
- Low Service Pumps - Manual operation at P.S. 4
- High Service Pumps - manual control from operations center. Low level alarm provided are provided for both reservoirs and the status is reported to the SCADA system.
- Elevated Tank - tied to Control Station 2

Plant Alarms:

- Basement Flooding - Yes
- Chlorine Leak - Yes
- Chlorine Supply - Yes
- Low Service Intake Well -
- Pretreatment Basin Levels - Yes, in Ozone
- Pretreatment Sump Pump Failure - Sump alarms
- Filter Level - No, has capability through SCADA
- Individual filter turbidity - Yes, not in op. yet
- FeCl storage tank filling- Yes
- CFE turbidity - Yes
- Backwash Holding Tank-Weir tank in front of WTP - Yes
- High Service Pump Discharge Pressure - Yes
- Finished Water Reservoir - Yes
- Elevated Storage tanks - Yes
- Elevated tank loss of signal - Yes
- Main Control System Failure- Back-up power supply
- L/H pressure at Baxter & Potter - 72-inch pipeline

Comment on Plant Metering and Controls:
Low level alarm at 3 MG well - 11 ft
Low level alarm at Dort reservoir - 5 ft

Valve Operation:
Are critical valves exercised on a routine basis? See status listed below

Valve Location	Exercised
Intake Valves	No
High Service Isolation valves	No
Clearwell Valves	Yes
Influent/Effluent Pretreatment Basins Valving	used in plant test-runs and equipment shakedowns
Effluent Flume Valve	No
Low Service Pump Discharge Valving	Yes
WTP treated water effl. valve to 3 Mgal well	Yes

MDEQ Conclusions/Recommendations

The WTP is equipped with numerous valves that are essential for reliable operation. These valves provide the ability to isolate critical components of the WTP. WTP staff need to maintain and expand their program of operating critical WTP valves. Also, an important component of this program is to have an accurate WTP yard piping diagram. The yard piping diagram should denote the location of buried piping on WTP plant grounds and their points of connection to the WTP, reservoirs, control stations, and the elevated tank.

Interruptions in Operation:

Electrical service to the WTP was upgraded during the rehabilitation project. The main circuit to the WTP located northeast of the WTP #1 has been upgraded with primary protection. New circuit breakers were installed and primary protection was provided.

Laboratory Certification:.

Comments on laboratory:
Continuous individual filter turbidity trends are compiled during WTP operation.

The laboratory staff have a written procedure in place for ferric jar testing and has compiled operating nomagraphs for varying operating condition. Procedures for lime and polymer feed have not been developed since they are not being used at this time.

WTP operators have acquired sufficient chlorine demand data with the installation the intermediate chlorination and the dechlorination systems. The laboratory has full micobiological lab certification - 2010 and the certification is due for renewal in 2013. The lab also has on-line chlorine monitoring; however, the monitoring is for monitoring the treatment process and is not reported; thus QA/QC procedures (EPA 600) for the on-line equipment is not required.

TABLE 2: LABORATORY: Purchased Water Operation

Parameter	*Method	Calibration	Sample Points	Sample Frequency
Alkalinity	2320 B. Titration Method	No calibration Standardization of titration chem monthly	Laboratory Tap Baxter & Potter Rd River Intake	1/day 1/day 3/week
Chlorine	4500-Cl G. DPD Colorimetric method 4500-Cl I. Iodometric Electrode Technique	No calibration check results with standard 3 point calibration prior to use of electrode	Laboratory Tap Baxter & Potter Rd Plant Storage Facilitie Distribution system	2/day 1/day 2/day 2/week
Fluoride	4500-F C Ion Selective Electrode	2 Point daily calibration	Laboratory Tap Baxter & Potter Rd River Intake	1/day 1/day 1/week
Hardness	2340 C. EDTA Titrimetric Method	No calibration Standardization of titration chemicals.	Laboratory Tap Baxter & Potter Rd River Intake	1/day 1/day 3/week
pH	4500- H+B. Electrometric Method	2 Point daily calibration	Laboratory Tap Baxter & Potter Rd River Intake	1/day 1/day 3/week
Temp.	2550 B. Laboratory & Fields Methods	Acc. check of therm. against NIST certified thermometer	Laboratory Tap River Intake	1/day 3/week
HPC	Index Simplate Method	No cal, sterility check of media & sample vessels. Use of pos. & neg. controls with each test group performed.	Laboratory Tap Distribution system	1/mo 1/mo
Turbidity	2130 B. Nephlometric Method	Daily calibration check with secondary stds, monthly calibration with primary standards	Laboratory Tap Baxter & Potter Rd	3/day 1/day
Coliform	Colilert Presence-Absence Method	No calibration, sterility check of media & sample vessels. Use of pos & neg controls w. each set of sample vessels & media rec.	Laboratory Tap Baxter & Potter Rd Plant storage faciliti Distribution system	2/day 1/day 2/day 2/week

TABLE 3: LABORATORY: Test Run Operation

Parameter	Method*	Calibration	Sample Points	Sample Frequency
Alkalinity	2320 B. Titration Method	No calibration, standardization of titration chemicals monthly	River Intake	1/day
			Plate Settler Effluent	Every 2 hours
			Solids Contact Center Mix Well	Every 2 hours
			Filter Effluent	1/day
Total Residual Chlorine	4500 - Cl Iodometric Electrode Technique	3 Point calibration, prior to testing.	River Outfall	Once, Daily
Ozone	4500 - O_3 Indigo Colorimetric Method	Yearly calibration of Spectrophotometer	Beginning of Contact Chamber #1	Every 4 hours
			Middle of Contact Chamber #2	Every 4 hours
			End of Contact Chamber #3	Every 4 hours
Hardness	2340 C. EDTA Titrimetric Method	No calibration, standardization of titration chemicals.	River Intake	1/day
			Plate Settler Effluent Solids Contact Effluent Filter Effluent	1/day
pH	4500 - H+ B. Electrometric Method	2 Point, daily calibration	River Intake	1/day
			Plate Settler Effluent	
			Solids Contact Center Mix Well	
			Solids Contact Effluent	1/day
Temp.	2550 B. Laboratory & Field Methods	Accuracy check of thermometer regularly against NIST certified thermometer.	River Intake	Every 4 hours
Turbidity	2130 B. Nephlometric Method	Daily calibration check with 2ndary stds, monthly calibration with primary stds.	River Intake	Every 4 hours
			Plate Settler Effluent	Every 4 hours
			Solids Contact Effluent	Every 4 hours
			Filter Effluent	Every 4 hours
Total Susp. Solids	2540 D. Total Suspended Solids Dried at 103-105° C	Daily calibration of analytical balance, and standards tested	River Outfall	Once, Daily
Coliform	Colilert Presence-Absence Method	No calibration, sterility check of media & sample vessels. Use of positive & negative controls with each set of sample vessels.	River Intake - MPN	1/day
			Plate Settler Effluent	Every 8 hours
	Colilert Quanti-Tray MPN		Filter Effluent	Each filter in service, 1/4 hrs

* all methods except for coliform testing come from Standard Methods for the Examination of Water and Wastewater.

P s and Regulations:

A art of the 1986 amendments to the Federal Safe Drinking Water Act, the Surface Water Treatment Rule (SWTR) was promulgated and became effective June 29, 1993. As part of the 1996 amendments to the Federal Safe Drinking Water Act, the Interim Enhanced Surface Water Treatment Rule (IESWTR) was promulgated and became effective January 1, 2002. .These rules and subsequent rules promulgated by the Michigan Department of Environmental Quality under the authority of the MSDWA, as amended, require the following of surface water treatment plants:

1. Maintain a disinfectant residual through the treatment process sufficient to inactivate Giardia and viruses. As currently operated, the plant complies with disinfectant residual contact time (C*T) requirements. The C*T calculation was updated as part of this survey and is also included in Appendix H.

2. Rule 325.10720 requires that a residual disinfectant concentration entering the distribution system be no less than 0.2 mg/L. Water suppliers must report to the MDEQ by the end of the next business day if the residual was below 0.2 mg/L. This requirement was met during the emergency operation in 2009 in *Flint* with chlorine. During the time that Flint receives purchased water from DWSD, the incoming chlorine residual has not dropped below 0.2 mg/L.

3. As further noted by Rule 325.10720, equipment must be provided to continuously monitor the chlorine residual leaving the plant. This provision is in place; however, WTP staff do not monitor chlorine residual leaving the WTP on a continuous basis for compliance since the WTP is a stand-by facility.

4. Residual disinfectant in the distribution system measured as total chlorine shall not be undetectable in more than 5% of the samples each month, or HPC counts must be no more than 500. Distribution residuals must be measured and reported whenever coliform samples are collected. Distribution system residuals are collected and reported whenever coliform samples are collected and total residuals have not reported as undetectable in more than 5% of samples colllected in any month.

gain, as noted by Rule 325.10720, turbidity determinations must be made at least once every 4 hours on samples representative of filtered water while the plant is in operation. A single monitoring point at a location containing effluent from all filters, but prior to storage is ideal for compliance purposes. The compliance point is at the filter confluence. During emergency operation, turbidity samples are collected from the CFE location once every 4 hours. All compliance points must be less than or equal to 0.3 NTU in 95% of samples each month, and at no time exceed 1 NTU.

6. Finally, the MSDWA requires that individual filter turbidity be monitored and recorded every 15 minutes. This information must be recorded and maintained for 3 years to determine compliance with "triggers". Individaul filter monitoring and on-line monitoring is maintained during routine WTP test-runs and emergency operation.

7. The Stage 1 of the Disinfectants/Disinfection Byproducts (DBPR) also became effective January 1, 2002 for surface water plant serving over 10,000 people.. This rule reduced the maximum contaminant level (MCL) for total trihalomethanes (TTHM) to 0.080 mg/L and set a MCL of 0.060 mg/L for total haloacetic acids (HAA5). In addition, a maximum disinfectant residual level (MDRL) for chlorine was established. A review of the Monthly Operation Reports and chemical sample results indicate that these water quality standards are being met.

8. The Stage 2 DBPR requires MCL compliance at all TTHM and HAA5 sampling locations rather than averaging results across the system. The Stage 2 IDSE requirements will determine whether treatment plant disinfection modifications willl be required. As a customer of DWSD, Flint is on Schedule 1 monitoring and has completed the first year of monitoring in 2012. Flint has met their LRAA and will qualify for reduced monitoring beginning in 2013. Stage 2 DBPR monitoring for Flint in 2013 is discussed further in their 2013 monitoring schedule..

9. The Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) requires increased Cryptosporidium treatment for certain vulnerable plants. Since the WTP is a stand-by facility, Crypto monitoring for bin classification was not required. Crypto. monitoring and bin classification will need to be conducted if the city elects to place the WTP into r tine operation.

WTP Sanitary Survey Summary

1. Designate a Back-up operator for the WTP. -Page 1

2. Replace switchgear for low service pumps #3 and #4. Page 6

3. Evaluate the future use level of the high service pump station as Flint's involvement in KWA is determined. Page 6

4. Provide adequate stand-by power generation when the WTP assumes fulltime operation. Page 6
5. Provide an additional sampling point in the ozone contact chamber (end of diffusion chamber Cell 1). Page 8

6. Maintain adequate moisture control in the flocculator control room. Page 9

7. Increase the length of WTP test runs if proficiency in softening is needed. Page 10

8. Correct piping constraint in the west wash water supply line. Page 14

9. Provide air-pack respirators for WTP operators for chlorine gas emergency. Page 16

10. Provide proper seal along door sweep for interior entrance door to chlorine gas room. Page 16

11. Inspect the 3 Mgal clearwell, verify integrity of concrete base around each manhole vent and repair as needed. Page 14

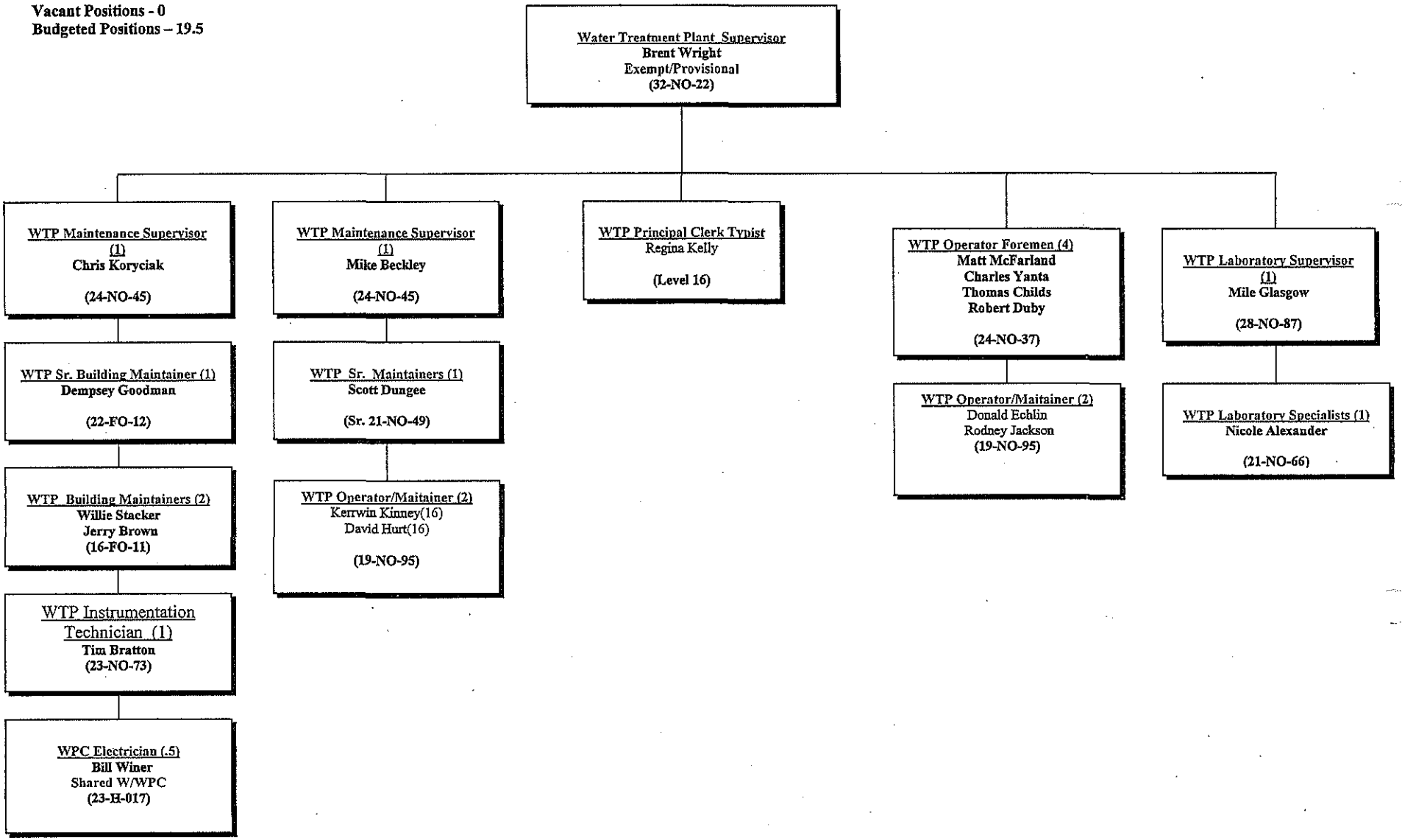
12. Expand WTP valve program. Page 23

APPENDIX A

Employee Organizational Chart

WATER TREATMENT PLANT
Personnel Organization Chart
(Fiscal Year 2012)

ctive Positions – 19.5
Vacant Positions - 0
Budgeted Positions – 19.5



APPENDIX B

WTP Permits - Segs 1-4

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND RADIOLOGICAL PROTECTION DIVISION

PERMIT FOR WATER SYSTEM CONSTRUCTION

THIS PERMIT IS ISSUED UNDER PROVISIONS OF SEC. 4 OF ACT 399, P.A. 1976, AS AMENDED, FOR CONSTRUCTION, OR ALTERATION, OF A WATERWORKS SYSTEM OR PORTIONS THEREOF DESCRIBED HEREON. IT DOES NOT OBVIATE THE NEED TO SATISFY VARIOUS REQUIREMENTS OF OTHER AGENCIES.

Mr. G. Robert Carlyon
City of Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

COMMUNITY WATER SUPPLY SECTION
3423 N MARTIN L KING JR BLVD PO BOX 30630
LANSING MI 48909-8130

ENVIRONMENTAL HEALTH SECTION
3423 N MARTIN L KING JR BLVD PO BOX 30630
LANSING MI 48909-8130

UPPER PENINSULA DISTRICT OFFICE
305 LUDINGTON STREET
ESCANABA MI 49829

PERMIT NUMBER	DATE ISSUED	ISSUED TO	
W991111	June 23, 1999	City of Flint	2310

SUBJECT: Water Treatment Plant Rehabilitation Phase I - Segment 1

ISSUED BY

Michael Prysby

Michael F. Prysby, P.E., District Engineer

June 23, 1999

This permit is for the following water system improvements at the Flint Water Treatment Plant in the City of Flint in accordance with plans and specifications prepared and submitted by Snell Environmental Group, Inc.

Boiler Facility:

Installation of a boiler facility heat system for Water Plant No. 2. The system shall consist of three boilers and all related equipment and appurtenances at Water Plant No. 2.

Electrical:

Electrical maintenance building for water plant and water system operations.

SCADA Control:

Installation of Supervisory Control and Data Acquisition (SCADA) control system in the Operations Center in Water Plant No. 2. The system shall consist of a Main Control Panel (MCP) and two complete desktop computer systems in the SCADA Room and will be designed to monitor and control individual facilities including:

- Baxter & Potter Station
- Genesee County Metering Vaults (5 locations)
- Control Station 2

This permit consists of 3 page(s).

This permit is valid for 2 years from date of issuance. If construction is not commenced within 2 years, a permit extension may be applied for in writing by identifying the project and the number on the permit for which the extension is requested.

It is a condition of this permit that the permittee give notice to public utilities pursuant to Act No. 53 of the Public Acts of 1974, as amended (MCLA 460.701 et seq.), and comply with the requirements of that Act.

Issuance of this permit is in compliance with the provisions of Executive Order 1974-4 and issued pursuant thereto.

- 2 MGAL Elevated Tank
- Dort Reservoir Inlet & Outlet
- Control Stations #3 & #5
- Pump Station #4
- Cedar Reservoir & Pump Station #3
- Westside Reservoir & Pump Station #5
- Torrey Road Booster Station
- Three distribution system pressure monitoring stations

Rapid Mix Basins:

Number of Units:	2 upflow units
Size of each:	5.5' X 5.5' X 16' side water depth (SWD); 3620 gallons
Design Capacity:	12,500 gpm (18 MGD) each
Chemicals:	Ferric Chloride
Mixers:	5.0 HP plate mount open mixer with adjustable frequency drive (AFD) 4:1 variable speed control; G-value of 380/sec; 1800 motor rpm; 100 impeller rpm

Flocculation Basins:

Number of Units:	2
Size of each:	44' X 80.3' X 16' SWD; 422,853 gallons
Design Capacity:	12,500 gpm (18 MGD) each with 34 min. flocculation
Flow-Through Velocity	1.3 fpm
Diameter of Influent Pipe:	36-inch main influent line with five 30-inch outlets
Diameter of Effluent Pipe:	Three 36-inch outlets manifolding and increasing to 60-inch prior to future plate settlers
Baffling:	Three stages (11.3 minutes detention time per stage @ 18 MGD)
Mixers:	15 (each basin); 2.0 HP vertical propeller units with AFD 10:1 variable speed control; G-values 30/sec to 80/sec

Chemical Feed:

Modification of the existing coagulant feed system to convey coagulant feed to the new application points at the rapid mix basins including one duplex metering pump rated at 80 GPH @ 100psi. One new metering pump shall be provided as a stand-by.

Additional improvements with the chemical feed facility shall be completed in subsequent segments of the water plant rehabilitation.

Interconnection Structure:

Demolition of the existing primary clarifier and construction of an interconnection structure to convey water from the flocculation basins to the existing secondary basins or future plate settlers.

Since one copy was received, we are retaining it for our records.

MFP:lw
cc: Mr. John O' Malia, P.E., Snell Environmental Group, Inc.
Mr. H. Jack Sargent, Director, Department of Public Works, City of Flint
Mr. Brian McKenzie, Genesee County Health Department

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND RADIOLOGICAL PROTECTION DIVISION

PERMIT FOR WATER SYSTEM CONSTRUCTION

THIS PERMIT IS ISSUED UNDER PROVISIONS OF SEC. 4 OF ACT 399, P.A. 1976, AS AMENDED, FOR CONSTRUCTION, OR ALTERATION, OF A WATERWORKS SYSTEM OR PORTIONS THEREOF DESCRIBED HEREON. IT DOES NOT OBVIATE THE NEED TO SATISFY VARIOUS REQUIREMENTS OF OTHER AGENCIES.

Mr. G. Robert Carlyon
City of Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

FIELD OPERATIONS SECTION
3423 N MARTIN L KING JR BLVD PO BOX 30630
LANSING MI 48909-8130

ENVIRONMENTAL HEALTH SECTION
3423 N MARTIN L KING JR BLVD PO BOX 30630
LANSING MI 48909-8130

PERMIT NUMBER	DATE ISSUED	ISSUED TO	
W001136	June 22, 2000	City of Flint	2310

SUBJECT: Water Treatment Plant
Rehabilitation
Phase I – Segment 2

ISSUED BY

Timothy P. Burton

Michael F. Prysby, P.E., District Engineer
Shiawassee District Office

June 22, 2000

This permit is for the following water system improvements at the Flint Water Treatment Plant in the City of Flint in accordance with plans and specifications prepared and submitted by DLZ Michigan, Inc. (Snell Environmental Group, Inc.)

Primary Clarifier Structure:

Number of Units: 1 - Building Footprint 133' 2" x 107' 10"
Three Pretreatment Basins: Each 39.5' x 82' x 17.5' (avg depth). Each basin is equipped with inclined plate settlers and has two (2) 54"x54" inlets and four (4) 24"x24" outlets.
Total Volume: 170,000 cubic feet
Total Rated Capacity of Primary Clarifier: 36 MGD (12 MGD per basin)
Loading Rate: 0.3 gpm/sqft
The primary clarifier is protected against flooding by a 20ft overflow weir from the effluent channel and a 30" diameter outlet that drains to a storm sewer.
Sludge collection is accomplished by a zoned grid of parallel piping under pump suction. The zones are activated by an air-actuated butterfly valve. Two (2) sludge pumps each rated at 350 gpm are provided.
The clarifier basins can be drained via two (2) drain pumps each rated at 350 gpm.

This permit consists of 2 page(s).

This permit is valid for 2 years from date of issuance. If construction is not commenced within 2 years, a permit extension may be applied for in writing by identifying the project and the number on the permit for which the extension is requested.

It is a condition of this permit that the permittee give notice to public utilities pursuant to Act No. 53 of the Public Acts of 1974, as amended (MCLA 460.701 et seq.), and comply with the requirements of that Act.

Issuance of this permit is in compliance with the provisions of Executive Order 1974-4 and issued pursuant thereto.

Site Improvement - Sanitary Sewer Connection

Re-direct the existing plant main drain upstream from the existing filter backwash piping to an existing 36-inch sanitary sewer in Dort Highway. The new connection shall include construction of a 4' diameter manhole with 12-inch HDPE discharge piping from the treatment plant to a proposed lift station. The lift station is equipped with two (2) pumps; one low flow pump rated at 400 gpm at 45' TDH, and one pump rated at 700 gpm at 31' TDH. The station discharges to an 8-inch force main, and is equipped with pump controls and alarms.

Site improvement - Cut and Cap discharge lines from abandoned Plant #1:

- One 42-inch line from the 3 MG Clearwell to the east.
- Two 30-inch lines from Pump Station #1.
- Three 24-inch lines from Pump Station #1.

Building and Grounds Facility

Construction of Building and Grounds Facility adjacent to the existing Electrical Maintenance Building.

Stop Logs and Flume Rehabilitation

Removal of eight (8) stop logs, installation of one (1) sluice gate and all associated concrete work to direct flocculated water to the existing solids contact units.

Repair of side walls, ceiling, and expansion joints of flume transmitting water to the filters.

Four copies of the plans and specifications were received. We are retaining one copy for our records. One copy will be retained by the Environmental Assistance Division and one copy each will be transmitted to the city and their engineer.

MFP:TAB:lw
cc: Mr. John O' Malia, P.E., DLZ Michigan, Inc. (SEG)
Mr. H. Jack Sargent, Director, Department of Public Works, City of Flint
Mr. Brian McKenzie, Genesee County Health Department

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND RADIOLOGICAL PROTECTION DIVISION

PERMIT FOR WATER SYSTEM CONSTRUCTION

THIS PERMIT IS ISSUED UNDER PROVISIONS OF SEC. 4 OF ACT 399, P.A. 1976, AS AMENDED, FOR CONSTRUCTION, OR ALTERATION, OF A WATERWORKS SYSTEM OR PORTIONS THEREOF DESCRIBED HEREON. IT DOES NOT OBVIATE THE NEED TO SATISFY VARIOUS REQUIREMENTS OF OTHER AGENCIES.

Mr. G. Robert Carlyon
City of Flint Water Plant
4500 North Dort Highway
Flint, Michigan 48505

FIELD OPERATIONS SECTION
3423 N MARTIN L KING JR BLVD PO BOX 30630
LANSING MI 48909-8130

ENVIRONMENTAL HEALTH SECTION
3423 N MARTIN L KING JR BLVD PO BOX 30630
LANSING MI 48909-8130

PERMIT NUMBER	DATE ISSUED	ISSUED TO
W011130	November 14, 2001	City of Flint 2310

SUBJECT: Water Treatment Plant Rehabilitation
Phase 1 - Segment 3

ISSUED BY

Michael Prysby

Michael F. Prysby, P.E., District Engineer
Shiawassee District Office

November 14, 2001

This permit is for the following water system improvements at the Flint Water Treatment Plant in the city of Flint in accordance with plans and specifications prepared and submitted by The DLZ Team.

Softening with Lime Feed:

Number of Units:	1
Type:	Solids contact unit
Size:	120 ft (diameter) X 15.2 ft deep
Volume:	1.28 mgal
Design Capacity:	11,800 gpm (17 mgd)
Chemicals:	Hydrated slaked lime, softening aid polymer, provisions for future soda ash
Mixer:	1 recirculation drive adjustable through a 6:1 range by use of a variable frequency drive.

Filter Rehabilitation:

Number of Filters:		4
Size:	Filter Box: (area)	28 ft (l) X 25 ft (w) X 9.92 ft (d) (700 sqft)
	Media: Top Layer:	18-inches anthracite, effective size 1.0 – 1.2 mm, uniformity coefficient <1.5
	Bottom Layer:	12-inches sand, effective size 0.45 – 0.55 mm, uniformity coefficient <1.6

This permit consists of 3 page(s).

This permit is valid for 2 years from date of issuance. If construction is not commenced within 2 years, a permit extension may be applied for in writing by identifying the project and the number on the permit for which the extension is requested.

It is a condition of this permit that the permittee give notice to public utilities pursuant to Act No. 53 of the Public Acts of 1974, as amended (MCLA 460.701 et seq.), and comply with the requirements of that Act.

Issuance of this permit is in compliance with the provisions of Executive Order 1974-4 and issued pursuant thereto.

Filter Rehabilitation Continued:

Water Depth Above Media:	7.92 ft
Design Capacity:	12.0 mgd (3.0 mgd each filter) rated at 3.0 gpm/sqft
Backwash Rate:	Variable range to 14 gpm/sqft using a combined air-water backwash system
Airwash Rate:	Up to 3 scfm/sqft (2 blowers; 2100 cfm at 6.5 psig each)
Backwash Troughs:	General Filter type, 9800 gpm capacity with 2-inch freeboard
Underdrain System:	General Filter Multi Concrete II – ABS plastic underdrain forms with plastic media-retaining nozzles

Chemical Feed:

Lime Feed: 2 lime slakers rated at 2000 lbs/hr each, 90% pebble lime from two storage bins sized at 120 tons each.

Re-carbonation:
Storage: One 34 ton CO2 storage tank
Feeder: Two CO2 feeders each rated at 325 lbs/hr
Contact Chamber: Two basins each at 50 ft (l) X 10.6 ft (w) X 14.0 (d) or 55,800 gal each.

Fluoride Feed: Six intermediate bulk storage containers (350 gal each), 3 metering pumps rated at 96 gpd each, two 55 gal constant head tanks, complete with controls interlocked with the low service pump and the west in channel flow meter.

Flocculation Aid Polymer: Two 30 gal carboys, three metering pumps rated at 0 to 1 gph each.

Softening Aid Polymer: Three intermediate bulk storage containers (250 gal each), three metering pumps rated at 0 to 2 gph each.

Coagulation Aid Polymer: Three intermediate bulk storage containers (250 gal each), three metering pumps rated at 0 to 2 gph each.

Raw Water Intake Screens

Provide 2 new intake traveling screens that replace the existing screens just prior to the raw water suction well.

Stop Log and Butterfly Valve Installation:

Install two rectangular butterfly valves to control flow around the west re-carbonation basin.

Laboratory Facility:

Provide new laboratory with equipment, potable water service, cabinets, furniture, electrical source and controls, telephone and computer cable.

Four copies of the plans and specifications were received. We are retaining one copy for our records. One copy will be retained by the Environmental Assistance Division and one copy each will be transmitted to the city and their engineer.

MFP:TAB:LW
cc: Mr. John O' Malia, P.E., DLZ Michigan, Inc. (SEG)
Mr. H. Jack Sargent, Director, Department of Public Works, City of Flint
Mr. Brian McKenzie, Genesee County Health Department

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
,NKING WATER AND RADIOLOGICAL PROTI ION DIVISION

PERMIT FOR WATER SYSTEM CONSTRUCTION

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Mr. Jeffrey Bryson, Interim Supervisor
City of Flint Water Treatment Plant
4500 North Dort Highway
Flint, Michigan 48505

FIELD OPERATIONS SECTION
525 W. Allegan, P.O. Box 30630
LANSING MI 48909-8130

ENVIRONMENTAL HEALTH SECTION
525 W. Allegan, P.O. Box 30630
LANSING MI 48909-8130

Shiawassee Michigan District Office
10650 Bennett Drive
Morrice, MI 48857-9792

PERMIT NUMBER	DATE ISSUED	ISSUED TO	WSSN NO.
W021097	June 10, 2002	City of Flint	2310

SUBJECT: Water Treatment Plant Rehabilitation Phase 1 - Segment 4

ISSUED BY

Michael Prysby

Michael F. Prysby, P.E., District Engineer
Shiawassee District Office

June 10, 2002

This permit is for the following water system improvements at the Flint Water Treatment Plant in the City of Flint in accordance with plans and specifications prepared and submitted by The DLZ Team.

Softening with Lime Feed:

Number of Units:	1
Type:	Solids contact unit
Size:	120 ft (diameter) X 16.2 ft deep
Volume:	1.38 mgal
Design Capacity:	13,300 gpm (19.2 mgd)
Chemicals:	Hydrated slaked lime, softening aid polymer, provisions for future soda ash
Mixer:	1 recirculation drive adjustable through a 6:1 range by use of a variable frequency drive.

Filter Rehabilitation:

Number of Filters:	8
Size: Filter Box: (area)	28 ft (l) X 25 ft (w) X 9.92 ft (d) (700 sqft)
Media: Top Layer:	18-inches anthracite, effective size 1.0 – 1.2 mm, uniformity coefficient <1.5
Bottom Layer:	12-inches sand, effective size 0.45 – 0.55 mm, uniformity coefficient <1.6

This permit consists of 3 page(s).

is permit is valid for 2 years from date of issuance. If construction is not commenced within 2 years, a permit extension may be applied for ,n writing by identifying the project and the number on the permit for which the extension is requested.

It is a condition of this permit that the permittee give notice to public utilities pursuant to Act No. 53 of the Public Acts of 1974, as amended (MCLA 460.701 et seq.), and comply with the requirements of that Act.

Issuance of this permit is in compliance with the provisions of Executive Order 1974-4 and issued pursuant thereto.

Filter Backwash Residual Management:

Construct one new 4000 gpm pumping station and wet well located south of the existing water treatment plant administrative offices and west of Pump Station No. 4. The station shall pump intercepted filter wash water to an existing clarifier located just north of Pump Station No. 4. The pumping station shall be equipped with three 2000 gpm submersible pumps.

Three wash water recirculation pumps each rated at 650 gpm at 40 ft. total dynamic head. The recirculation pumps shall pump water from the backwash wastewater retention tank to sedimentation basin just prior to the ozone facility.

Controls/Automation:

Provide monitoring system to be integrated into existing supervisory control and data acquisition (SCADA) system including:

Turbidity Monitoring:	Indicate and record turbidity at each filter, the north and south filter effluent piping, and provide filter turbidity alarms.
Ferric Chloride Storage:	Provide level sensing system that controls the bulk storage tank filling procedure and valve position during operation.
Flow metering:	Provide one ultrasonic flow meter to measure flow to the east clarifier influent.

Locker/Lunch/Meeting Facilities:

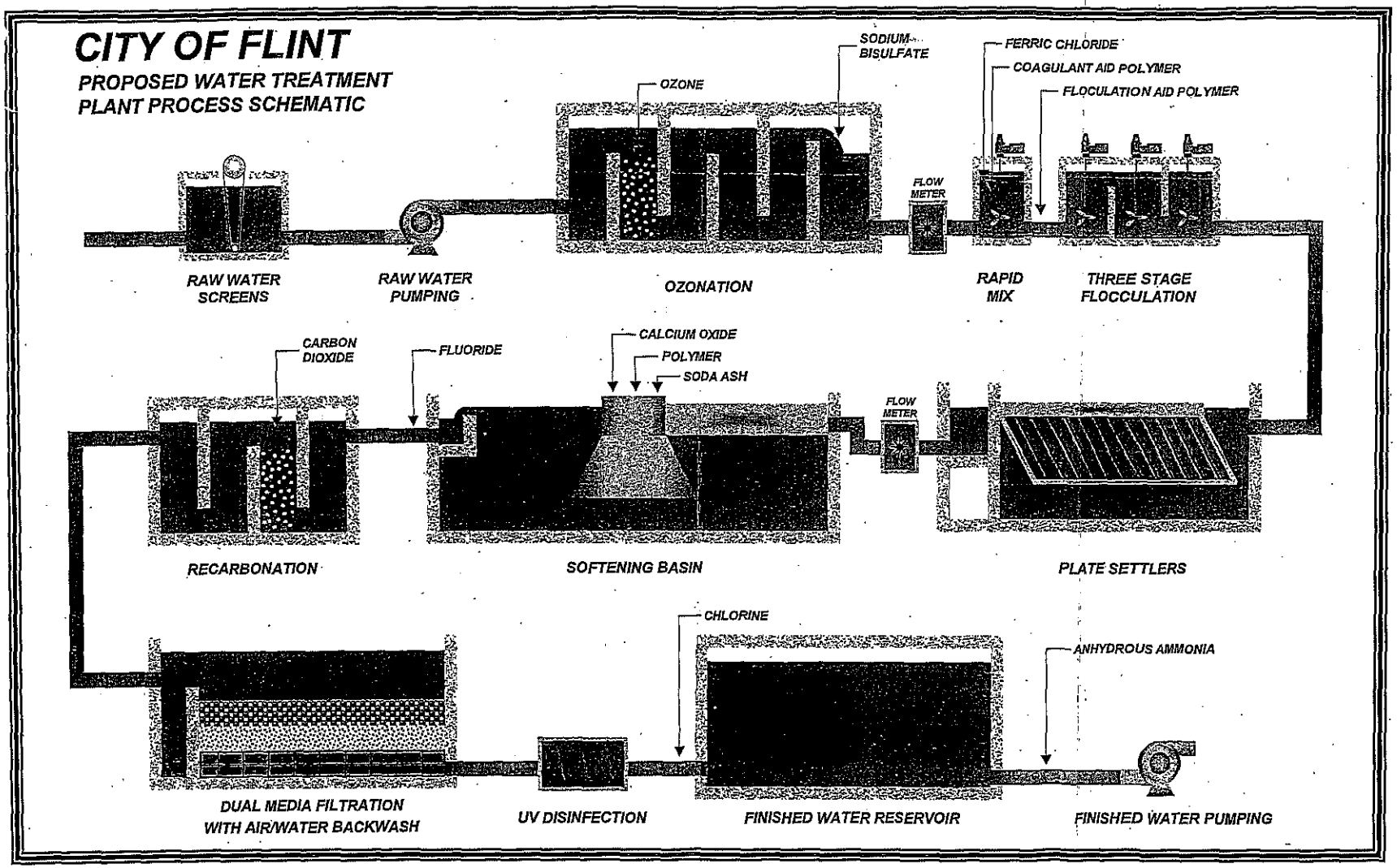
Rehabilitate existing space to new mens/womens locker rooms and lunch rooms with equipment, cabinets, furniture, plumbing, etc.

Four copies of the plans and specifications were received. We are retaining one copy for our records. One copy will be retained by the Environmental Assistance Division and one copy each will be transmitted to the city and their engineer.

MFP:TAB:LW
cc: Mr. Mark H. Nye, P.E., DLZ Michigan, Inc.
Mr. G. Robert Carlyon, City of Flint
Ms. Edwyna McKee, Environmental Assistance Division
Mr. Brian McKenzie, Genesee County Health Department

APPENDIX C

WTP Flow Diagram


CITY OF FLINT
PROPOSED WATER TREATMENT
PLANT PROCESS SCHEMATIC
SODIUM BISULFATE
FERRIC CHLORIDE
COAGULANT AID POLYMER
FLOCULATION AID POLYMER
OZONE
FLOW METER
RAW WATER SCREENS
RAW WATER PUMPING
OZONATION
RAPID MIX
THREE STAGE FLOCCULATION
CARBON DIOXIDE
FLUORIDE
CALCIUM OXIDE
POLYMER
SODA ASH
FLOW METER
RECARBONATION
SOFTENING BASIN
PLATE SETTLERS
CHLORINE
ANHYDROUS AMMONIA
DUAL MEDIA FILTRATION WITH AIR/WATER BACKWASH
UV DISINFECTION
FINISHED WATER RESERVOIR
FINISHED WATER PUMPING

Usage	Commodity	Color
Water Lines	Raw	Olive green
	Settled or Clarified	Aqua
	Finished or Potable	Dark Blue
Chemical Lines	Alum or Primary Coagulant	Orange
	Ammonia	White
	Carbon Slurry	Black
	Caustic	Yellow with Green Band
	Chlorine (Gas or Solution)	Yellow
	Fluoride	Light Blue with Red Band
	Lime Slurry	Light Green
	Ozone	Yellow with Orange Band
	Phosphate Compounds	Light Green with Red Band
	Polymers or Coagulant Aids	Orange with Green Band
	Potassium Permanganate	Violet
	Soda Ash	Light Green with Orange Band
	Sulfuric Acid	Yellow with Red Band
	Sulfur Dioxide	Light Green with Yellow Band
Waste Lines	Backwash Waste	Light Brown
	Sludge	Dark Brown
	Sewer (Sanitary or Other)	Dark Gray
Other	Compressed Air	Dark Green
	Gas	Red
	Other Lines	Light Gray

APPENDIX D

Monitoring Schedule

2310

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

February 22, 2013

Mr. Robert Bisnick
Water Service Center
3310 East Court Street
Flint, MI 48506

WSSN: 02310
City Of Flint

Dear Mr. Bisnick:

SUBJECT: Drinking Water Monitoring Schedule – 2013
Annual Reports

Enclosed is your Drinking Water Monitoring Schedule for calendar year 2013 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. To order bottles, call the DEQ Laboratory at 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 "2013 Monitoring and Reporting Requirements." This provides additional details about monitoring and reporting requirements. If you have any questions, please contact us at the numbers below.

Sincerely,

Michael F. Prysby, P.E., District Engineer
Field Operation Section
Office of Drinking Water and
Municipal Assistance
517-335-6122

Adam Rosenthal, EQA
Field Operation Section
Office of Drinking Water and
Municipal Assistance
517-335-6131

MFP:AR:JR

Enclosure
cc/encl: Mr. Brent Wright, W T P Supervisor

2013 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	23/36 months	Between 06/01 and 09/30/2014	DIST	$26.00	36CC	CCUB
Water Quality Parameters	Representative Sites	10/3 months	**Quarterly**	DIST	Various	Various	Various
Total Trihalomethanes	DBP Monitoring Plan	2/3 months	**Quarterly**	DIST	$65.00	36VO	CXTM
Haloacetic Acids		2/3 months	**Quarterly**	DIST	$130.00	36HA	CXHA

Need to revise
DBPR2 Monitoring
Plan
Reduced Sites

APPENDIX E

Chemical Analysis

MICHIGAN L PARTMENT OF ENVIRONMENTA 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
LE52512

Official Laboratory Report

Report To: MIKE GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:		
Collection Address:	4500 N DORT HWY,FLINT	Source:	Other	
Collected By:	M GLASGOW	Site Code:		
Township/Well#/Section:	//	Collector:	Public Water Supply Operator	
County:	Genesee	Date Collected:	10/12/2012	13:00
Sample Point:	COMBINED FILTER EFFLUENT	Date Received:	10/16/2012	12:56
Water System:	Other	Purpose:	Other	

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
OT TESTED^^^	Not Tested	10/22/2012				NOTST-00-C
Sample analysis was not completed. Sample was lost in laboratory accident due to extractor equipment malfunction. Please resample for test code CXRT.						
Antimony	Not detected	10/17/2012	0.0006	0.006	EPA 200.8	7440-36-0
Arsenic	Not detected	10/17/2012	0.002	0.010	EPA 200.8	7440-38-2
Barium	0.05	10/17/2012	0.01	2	EPA 200.8	7440-39-3
Beryllium	Not detected	10/17/2012	0.0004	0.004	EPA 200.8	7440-41-7
Cadmium	Not detected	10/17/2012	0.0003	0.005	EPA 200.8	7440-43-9
Chromium	Not detected	10/17/2012	0.01	0.1	EPA 200.8	7440-47-3
Cyanide-Available	Not Detected	10/22/2012	0.02	0.2	OIA-1677	57-12-5
Lead	Not detected	10/17/2012	0.001	0.015	EPA 200.8	7439-92-1
Mercury	Not detected	10/17/2012	0.0001	0.002	EPA 200.8	7439-97-6
Nickel	Not detected	10/17/2012	0.01	0.1	EPA 200.8	7440-02-0
Selenium	0.001	10/17/2012	0.001	0.05	EPA 200.8	7782-49-2
Thallium	Not detected	10/17/2012	0.0002	0.002	EPA 200.8	7440-28-0
Carbamates by HPLC						
3 Hydroxycarbofuran	Not Detected	10/23/2012	0.001		EPA 531.2	16655-82-6
Aldicarb	Not Detected	10/23/2012	0.0005		EPA 531.2	116-06-3
Aldicarb sulfone	Not Detected	10/23/2012	0.0005		EPA 531.2	1646-88-4
Aldicarb sulfoxide	Not Detected	10/23/2012	0.0005		EPA 531.2	1646-87-3
Carbaryl	Not Detected	10/23/2012	0.001		EPA 531.2	63-25-2
C furan	Not Detected	10/23/2012	0.0005	0.04	EPA 531.2	1563-66-2
Methiocarb	Not Detected	10/23/2012	0.001		EPA 531.2	2032-65-7

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 D 'ARTMENT OF ENVIRONMENTA 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
LE52512

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Carbamates by HPLC						
Methomyl	Not Detected	10/23/2012	0.001		EPA 531.2	16752-77-5
Oxamyl	Not Detected	10/23/2012	0.001	0.2	EPA 531.2	23135-22-0
Propoxur	Not Detected	10/23/2012	0.001		EPA 531.2	114-26-1
Chlorinated Acid Herbicides						
2,4,5-T	Not Detected	10/18/2012	0.002		EPA 515.4	93-76-5
2,4,5-TP (silvex)	Not Detected	10/18/2012	0.0003	0.05	EPA 515.4	93-72-1
2,4-D	Not Detected	10/18/2012	0.002	0.07	EPA 515.4	94-75-7
Acifluorfen	Not Detected	10/18/2012	0.004		EPA 515.4	50594-66-6
Bentazon	Not Detected	10/18/2012	0.002		EPA 515.4	25057-89-0
Dicamba	Not Detected	10/18/2012	0.002		EPA 515.4	1918-00-9
Dinoseb	Not Detected	10/18/2012	0.0003	0.007	EPA 515.4	88-85-7
Pentachlorophenol	Not Detected	10/18/2012	0.00006	0.001	EPA 515.4	87-86-5
Picloram	Not Detected	10/18/2012	0.001	0.5	EPA 515.4	1918-02-1
T( )DCPA degradates, mono- and di-acid	Not Detected	10/18/2012	0.001		EPA 515.4	1861-32-1
Volatile Organic Compounds						
1,1 Dichloroethane	Not Detected	10/22/2012	0.0005		EPA 524.2	75-34-3
1,1 Dichloroethylene	Not Detected	10/22/2012	0.0005	0.007	EPA 524.2	75-35-4
1,1 Dichloropropene	Not Detected	10/22/2012	0.0005		EPA 524.2	563-58-6
1,1,1 Trichloroethane	Not Detected	10/22/2012	0.0005	0.2	EPA 524.2	71-55-6
1,1,1,2 Tetrachloroethane	Not Detected	10/22/2012	0.0005		EPA 524.2	630-20-6
1,1,2 Trichloroethane	Not Detected	10/22/2012	0.0005	0.005	EPA 524.2	79-00-5
1,1,2,2 Tetrachloroethane	Not Detected	10/22/2012	0.0005		EPA 524.2	79-34-5
1,2 Dichlorobenzene	Not Detected	10/22/2012	0.0005	0.6	EPA 524.2	95-50-1
1,2 Dichloroethane	Not Detected	10/22/2012	0.0005	0.005	EPA 524.2	107-06-2
1,2 Dichloropropane	Not Detected	10/22/2012	0.0005	0.005	EPA 524.2	78-87-5
1,2,3 Trichlorobenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	87-61-6
1,2,3 Trichloropropane	Not Detected	10/22/2012	0.0005		EPA 524.2	96-18-4
1,2,4 Trichlorobenzene	Not Detected	10/22/2012	0.0005	0.07	EPA 524.2	120-82-1
1,2,4 Trimethylbenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	95-63-6
1,3 Dichlorobenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	541-73-1
1,3 Dichloropropane	Not Detected	10/22/2012	0.0005		EPA 524.2	142-28-9
1,3,5 Trimethylbenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	108-67-8
1,4 Dichlorobenzene	Not Detected	10/22/2012	0.0005	0.075	EPA 524.2	106-46-7
2, chloropropane	Not Detected	10/22/2012	0.0005		EPA 524.2	594-20-7
Be zene	Not Detected	10/22/2012	0.0005	0.005	EPA 524.2	71-43-2

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 D PARTMENT OF ENVIRONMENTA QUALITY
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P.O. Box 30270
Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562

Sample Number
LE52512

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Volatile Organic Compounds						
Bromobenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	108-86-1
Bromochloromethane	Not Detected	10/22/2012	0.0005		EPA 524.2	74-97-5
Bromodichloromethane	0.0050	10/22/2012	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0010	10/22/2012	0.0005	0.080	EPA 524.2	75-25-2
Bromomethane	Not Detected	10/22/2012	0.001		EPA 524.2	74-83-9
Carbon tetrachloride	Not Detected	10/22/2012	0.0005	0.005	EPA 524.2	56-23-5
Chlorobenzene	Not Detected	10/22/2012	0.0005	0.1	EPA 524.2	108-90-7
Chlorodibromomethane	0.0056	10/22/2012	0.0005	0.080	EPA 524.2	124-48-1
Chloroethane	Not Detected	10/22/2012	0.0005		EPA 524.2	75-00-3
Chloroform	0.0029	10/22/2012	0.0005	0.080	EPA 524.2	67-66-3
Chloromethane	Not Detected	10/22/2012	0.0005		EPA 524.2	74-87-3
cis-1,2 Dichloroethylene	Not Detected	10/22/2012	0.0005	0.07	EPA 524.2	156-59-2
cis-1,3 Dichloropropene	Not Detected	10/22/2012	0.0005		EPA 524.2	10061-01-5
Di[illegible]momethane	Not Detected	10/22/2012	0.0005		EPA 524.2	74-95-3
D[illegible]orodifluoromethane	Not Detected	10/22/2012	0.001		EPA 524.2	75-71-8
Dichloromethane	Not Detected	10/22/2012	0.0006	0.005	EPA 524.2	75-09-2
Ethylbenzene	Not Detected	10/22/2012	0.0005	0.7	EPA 524.2	100-41-4
Fluorotrichloromethane	Not Detected	10/22/2012	0.001		EPA 524.2	75-69-4
Hexachlorobutadiene	Not Detected	10/22/2012	0.0005		EPA 524.2	87-68-3
Isopropylbenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	98-82-8
m & p-Xylene	Not Detected	10/22/2012	0.0005	10	EPA 524.2	XYLMP-00-C
Methyl ethyl ketone	Not Detected	10/22/2012	0.005		EPA 524.2	78-93-3
Methyl isobutyl ketone	Not Detected	10/22/2012	0.005		EPA 524.2	108-10-1
Methyl-tert-butyl ether (MTBE)	Not Detected	10/22/2012	0.001		EPA 524.2	1634-04-4
Naphthalene	Not Detected	10/22/2012	0.0005		EPA 524.2	91-20-3
n-Butylbenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	104-51-8
Nitrobenzene	Not Detected	10/22/2012	0.01		EPA 524.2	98-95-3
n-Propylbenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	103-65-1
o-Chlorotoluene	Not Detected	10/22/2012	0.0005		EPA 524.2	95-49-8
o-Xylene	Not Detected	10/22/2012	0.0005	10	EPA 524.2	95-47-6
p-Chlorotoluene	Not Detected	10/22/2012	0.0005		EPA 524.2	106-43-4
p-Isopropyltoluene	Not Detected	10/22/2012	0.0005		EPA 524.2	99-87-6
sec-Butylbenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	135-98-8
Styrene	Not Detected	10/22/2012	0.0005	0.1	EPA 524.2	100-42-5
tert-Butylbenzene	Not Detected	10/22/2012	0.0005		EPA 524.2	98-06-6
Tetrachloroethylene	Not Detected	10/22/2012	0.0005	0.005	EPA 524.2	127-18-4
T[illegible]hydrofuran	Not Detected	10/22/2012	0.005		EPA 524.2	109-99-9
T[illegible]ene	Not Detected	10/22/2012	0.0005	1	EPA 524.2	108-88-3

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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 D PARTMENT OF ENVIRONMENTA 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
LE52512

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Volatile Organic Compounds						
Total Trihalomethanes	0.015	10/22/2012	NA	0.080	EPA 524.2	TTHM-00-C
Total Xylenes	Not Detected	10/22/2012	NA	10	EPA 524.2	1330-20-7
trans-1,2 Dichloroethylene	Not Detected	10/22/2012	0.0005	0.1	EPA 524.2	156-60-5
trans-1,3 Dichloropropene	Not Detected	10/22/2012	0.0005		EPA 524.2	10061-02-6
Trichloroethylene	Not Detected	10/22/2012	0.0005	0.005	EPA 524.2	79-01-6
Vinyl chloride	Not Detected	10/22/2012	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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FAX: (517) 335-8562

Sample Number
LE35013

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:	4500 N DORT HWY,FLINT	Source:	Other	
Collected By:	M GLASGOW	Site Code:		
Township/Well#/Section:	//	Collector:	Public Water Supply Operator	
County:	Genesee	Date Collected:	06/29/2012	11:45
Sample Point:	COMBINED FILTER EFFLUENT - POST O3	Date Received:	07/03/2012	11:37
Water System:	Other	Purpose:	Other	

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
^ NOT TESTED^^^	Not Tested	07/17/2012				NOTST-00-C
Analysis for volatile organic compounds was not completed within EPA holding time due to a clerical error. Please resample for test code CXVO.						
Antimony	Not detected	07/12/2012	0.0006	0.006	EPA 200.8	7440-36-0
Arsenic	Not detected	07/12/2012	0.002	0.010	EPA 200.8	7440-38-2
Barium	0.05	07/12/2012	0.01	2	EPA 200.8	7440-39-3
Beryllium	Not detected	07/12/2012	0.0004	0.004	EPA 200.8	7440-41-7
Cadmium	Not detected	07/12/2012	0.0003	0.005	EPA 200.8	7440-43-9
Chromium	Not detected	07/12/2012	0.01	0.1	EPA 200.8	7440-47-3
Cyanide-Available	Not Detected	07/09/2012	0.02	0.2	OIA-1677	57-12-5
Sample collection date was not given or incorrect date given. Results will be evaluated by regulating agency.						
Lead	Not detected	07/12/2012	0.001	0.015	EPA 200.8	7439-92-1
Mercury	Not detected	07/12/2012	0.0001	0.002	EPA 200.8	7439-97-6
Nickel	Not detected	07/12/2012	0.01	0.1	EPA 200.8	7440-02-0
Selenium	Not detected	07/12/2012	0.001	0.05	EPA 200.8	7782-49-2
Thallium	Not detected	07/12/2012	0.0002	0.002	EPA 200.8	7440-28-0
Carbamates by HPLC						
3 Hydroxycarbofuran	Not Detected	07/13/2012	0.001		EPA 531.2	16655-82-6
Aldicarb	Not Detected	07/13/2012	0.0005		EPA 531.2	116-06-3
Aldicarb sulfone	Not Detected	07/13/2012	0.0005		EPA 531.2	1646-88-4
Aldicarb sulfoxide	Not Detected	07/13/2012	0.0005		EPA 531.2	1646-87-3
Carbaryl	Not Detected	07/13/2012	0.001		EPA 531.2	63-25-2
Carbofuran	Not Detected	07/13/2012	0.0005	0.04	EPA 531.2	1563-66-2
ethiocarb	Not Detected	07/13/2012	0.001		EPA 531.2	2032-65-7

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FAX: (517) 335-8562

Sample Number
LE35013

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Carbamates by HPLC						
Methomyl	Not Detected	07/13/2012	0.001		EPA 531.2	16752-77-5
Oxamyl	Not Detected	07/13/2012	0.001	0.2	EPA 531.2	23135-22-0
Propoxur	Not Detected	07/13/2012	0.001		EPA 531.2	114-26-1
Chlorinated Acid Herbicides						
2,4,5-T	Not Detected	07/11/2012	0.002		EPA 515.4	93-76-5
2,4,5-TP (silvex)	Not Detected	07/11/2012	0.0003	0.05	EPA 515.4	93-72-1
2,4-D	Not Detected	07/11/2012	0.002	0.07	EPA 515.4	94-75-7
Acifluorfen	Not Detected	07/11/2012	0.004		EPA 515.4	50594-66-6
Bentazon	Not Detected	07/11/2012	0.002		EPA 515.4	25057-89-0
Dicamba	Not Detected	07/11/2012	0.002		EPA 515.4	1918-00-9
Dinoseb	Not Detected	07/11/2012	0.0003	0.007	EPA 515.4	88-85-7
Pentachlorophenol	Not Detected	07/11/2012	0.00006	0.001	EPA 515.4	87-86-5
Picloram	Not Detected	07/11/2012	0.001	0.5	EPA 515.4	1918-02-1
'al DGPA degradates, mono- and -acid	Not Detected	07/11/2012	0.001		EPA 515.4	1861-32-1

Sample collection date was not given or incorrect date given. Results will be evaluated by regulating agency.
Quality control results for pentachlorophenol were outside allowed limits due to matrix interferences.

Pesticides Analysis by GC/MS						
4,4'-DDD	Not Detected	07/09/2012	0.001		EPA 525.2	72-54-8
4,4'-DDE	Not Detected	07/09/2012	0.001		EPA 525.2	72-55-9
4,4'-DDT	Not Detected	07/09/2012	0.0005		EPA 525.2	50-29-3
Acetochlor	Not Detected	07/09/2012	0.001		EPA 525.2	34256-82-1
Alachlor	Not Detected	07/09/2012	0.0002	0.002	EPA 525.2	15972-60-8
Aldrin	Not Detected	07/09/2012	0.0004		EPA 525.2	309-00-2
alpha-Chlordane	Not Detected	07/09/2012	0.0002	0.002	EPA 525.2	5103-71-9
Atrazine	Not Detected	07/09/2012	0.0002	0.003	EPA 525.2	1912-24-9
Dieldrin	Not Detected	07/09/2012	0.0005		EPA 525.2	60-57-1
Endrin	Not Detected	07/09/2012	0.0001	0.002	EPA 525.2	72-20-8
Endrin aldehyde	Not Detected	07/09/2012	0.001		EPA 525.2	7421-93-4
gamma-Chlordane	Not Detected	07/09/2012	0.0002	0.002	EPA 525.2	5103-74-2
Heptachlor	Not Detected	07/09/2012	0.0002	0.0004	EPA 525.2	76-44-8
Heptachlor epoxide	Not Detected	07/09/2012	0.0001	0.0002	EPA 525.2	1024-57-3
Hexachlorobenzene	Not Detected	07/09/2012	0.0001	0.001	EPA 525.2	118-74-1
Hexachlorocyclohexane (alpha-BHC)	Not Detected	07/09/2012	0.001		EPA 525.2	319-84-6
Hexachlorocyclohexane (beta-BHC)	Not Detected	07/09/2012	0.001		EPA 525.2	319-85-7
Hexachlorocyclohexane (delta-BHC)	Not Detected	07/09/2012	0.001		EPA 525.2	319-86-8

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Systems Mgmt. Unit Mgr: George Krisztian

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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
LE35013

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						
Hexachlorocyclopentadiene	Not Detected	07/09/2012	0.0005	0.05	EPA 525.2	77-47-4
Lindane (gamma-BHC)	Not Detected	07/09/2012	0.0001	0.0002	EPA 525.2	58-89-9
Methoxychlor	Not Detected	07/09/2012	0.0001	0.04	EPA 525.2	72-43-5
Metolachlor	Not Detected	07/09/2012	0.001		EPA 525.2	51218-45-2
Metribuzin	Not Detected	07/09/2012	0.001		EPA 525.2	21087-64-9
Molinate	Not Detected	07/09/2012	0.0005		EPA 525.2	2212-67-1
PCB (aroclor 1016)	Not Detected	07/09/2012	0.0001	0.0005	EPA 525.2	12674-11-2
PCB (aroclor 1221)	Not Detected	07/09/2012	0.0001	0.0005	EPA 525.2	11104-28-2
PCB (aroclor 1232)	Not Detected	07/09/2012	0.0001	0.0005	EPA 525.2	11141-16-5
PCB (aroclor 1242)	Not Detected	07/09/2012	0.0001	0.0005	EPA 525.2	53469-21-9
PCB (aroclor 1248)	Not Detected	07/09/2012	0.0001	0.0005	EPA 525.2	12672-29-6
PCB (aroclor 1254)	Not Detected	07/09/2012	0.0001	0.0005	EPA 525.2	11097-69-1
PCB (aroclor 1260)	Not Detected	07/09/2012	0.0001	0.0005	EPA 525.2	11096-82-5
Polybrominated biphenyls	Not Detected	07/09/2012	0.0001		EPA 525.2	59536-65-1
ıazine	Not Detected	07/09/2012	0.0002	0.004	EPA 525.2	122-34-9
oxaphene	Not Detected	07/09/2012	0.001	0.003	EPA 525.2	8001-35-2

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

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MCL : Maximum Contaminant Level
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Systems Mgmt. Unit Mgr: George Krisztian

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USEPA Region V Drinking Water Cert. No. MI00003
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Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562

Sample Number
LE26411

Official Laboratory Report

Report To: MICHAEL GLASGOW
4500 N DORT HWY
FLINT MI 48505

System Name/Owner:	CITY OF FLINT	WSSN/Pool ID:	2310	
Collection Address:	4500 N DORT HWY,FLINT	Source:	Other	
Collected By:	M GLASGOW	Site Code:		
Township/Well#/Section:	//	Collector:	Other	
County:	Genesee	Date Collected:	05/03/2012	13:00
Sample Point:	COMBINED FILTER EFFLUET/POST OZON	Date Received:	05/07/2012	12:35
Water System:	Other	Purpose:	Other	

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
^^^ NOT TESTED^^^	Not Tested	05/11/2012				NOTST-00-C
CXPT sample was lost in laboratory accident.						
Antimony	Not detected	05/11/2012	0.0006	0.006	EPA 200.8	7440-36-0
Arsenic	Not detected	05/11/2012	0.002	0.010	EPA 200.8	7440-38-2
Barium	0.04	05/11/2012	0.01	2	EPA 200.8	7440-39-3
Beryllium	Not detected	05/11/2012	0.0004	0.004	EPA 200.8	7440-41-7
Cadmium	Not detected	05/11/2012	0.0003	0.005	EPA 200.8	7440-43-9
Chromium	Not detected	05/11/2012	0.01	0.1	EPA 200.8	7440-47-3
Cyanide-Available	Not Detected	05/07/2012	0.02	0.2	OIA-1677	57-12-5
Lead	Not detected	05/11/2012	0.001	0.015	EPA 200.8	7439-92-1
Mercury	Not detected	05/11/2012	0.0001	0.002	EPA 200.8	7439-97-6
Nickel	Not detected	05/11/2012	0.01	0.1	EPA 200.8	7440-02-0
Selenium	Not detected	05/11/2012	0.001	0.05	EPA 200.8	7782-49-2
Thallium	Not detected	05/11/2012	0.0002	0.002	EPA 200.8	7440-28-0
Carbamates by HPLC						
3 Hydroxycarbofuran	Not Detected	05/17/2012	0.001		EPA 531.2	16655-82-6
Aldicarb	Not Detected	05/17/2012	0.0005		EPA 531.2	116-06-3
Aldicarb sulfone	Not Detected	05/17/2012	0.0005		EPA 531.2	1646-88-4
Aldicarb sulfoxide	Not Detected	05/17/2012	0.0005		EPA 531.2	1646-87-3
Carbaryl	Not Detected	05/17/2012	0.001		EPA 531.2	63-25-2
Carbofuran	Not Detected	05/17/2012	0.0005	0.04	EPA 531.2	1563-66-2
Methiocarb	Not Detected	05/17/2012	0.001		EPA 531.2	2032-65-7
Methomyl	Not Detected	05/17/2012	0.001		EPA 531.2	16752-77-5

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Sample Number
LE26411

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Carbamates by HPLC						
Oxamyl	Not Detected	05/17/2012	0.001	0.2	EPA 531.2	23135-22-0
Propoxur	Not Detected	05/17/2012	0.001		EPA 531.2	114-26-1
Chlorinated Acid Herbicides						
2,4,5-T	Not Detected	05/15/2012	0.002		EPA 515.4	93-76-5
2,4,5-TP (silvex)	Not Detected	05/15/2012	0.0003	0.05	EPA 515.4	93-72-1
2,4-D	Not Detected	05/15/2012	0.002	0.07	EPA 515.4	94-75-7
Acifluorfen	Not Detected	05/15/2012	0.004		EPA 515.4	50594-66-6
Bentazon	Not Detected	05/15/2012	0.002		EPA 515.4	25057-89-0
Dicamba	Not Detected	05/15/2012	0.002		EPA 515.4	1918-00-9
Dinoseb	Not Detected	05/15/2012	0.0003	0.007	EPA 515.4	88-85-7
Pentachlorophenol	Not Detected	05/15/2012	0.00006	0.001	EPA 515.4	87-86-5
Picloram	Not Detected	05/15/2012	0.001	0.5	EPA 515.4	1918-02-1
Total DCPA degradates, mono- and di-acid	Not Detected	05/15/2012	0.001		EPA 515.4	1861-32-1

Quality control results for bentazon and acifluorofen were outside allowed limits due to matrix interferences.

Volatile Organic Compounds						
1,1 Dichloroethane	Not Detected	05/17/2012	0.0005		EPA 524.2	75-34-3
1,1 Dichloroethylene	Not Detected	05/17/2012	0.0005	0.007	EPA 524.2	75-35-4
1,1 Dichloropropene	Not Detected	05/17/2012	0.0005		EPA 524.2	563-58-6
1,1,1 Trichloroethane	Not Detected	05/17/2012	0.0005	0.2	EPA 524.2	71-55-6
1,1,1,2 Tetrachloroethane	Not Detected	05/17/2012	0.0005		EPA 524.2	630-20-6
1,1,2 Trichloroethane	Not Detected	05/17/2012	0.0005	0.005	EPA 524.2	79-00-5
1,1,2,2 Tetrachloroethane	Not Detected	05/17/2012	0.0005		EPA 524.2	79-34-5
1,2 Dichlorobenzene	Not Detected	05/17/2012	0.0005	0.6	EPA 524.2	95-50-1
1,2 Dichloroethane	Not Detected	05/17/2012	0.0005	0.005	EPA 524.2	107-06-2
1,2 Dichloropropane	Not Detected	05/17/2012	0.0005	0.005	EPA 524.2	78-87-5
1,2,3 Trichlorobenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	87-61-6
1,2,3 Trichloropropane	Not Detected	05/17/2012	0.0005		EPA 524.2	96-18-4
1,2,4 Trichlorobenzene	Not Detected	05/17/2012	0.0005	0.07	EPA 524.2	120-82-1
1,2,4 Trimethylbenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	95-63-6
1,3 Dichlorobenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	541-73-1
1,3 Dichloropropane	Not Detected	05/17/2012	0.0005		EPA 524.2	142-28-9
1,3,5 Trimethylbenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	108-67-8
1,4 Dichlorobenzene	Not Detected	05/17/2012	0.0005	0.075	EPA 524.2	106-46-7
2,2 Dichloropropane	Not Detected	05/17/2012	0.0005		EPA 524.2	594-20-7
Benzene	Not Detected	05/17/2012	0.0005	0.005	EPA 524.2	71-43-2

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
LE26411

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Volatile Organic Compounds						
Bromobenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	108-86-1
Bromochloromethane	Not Detected	05/17/2012	0.0005		EPA 524.2	74-97-5
Bromodichloromethane	0.0065	05/17/2012	0.0005	0.080	EPA 524.2	75-27-4
Bromoform	0.0023	05/17/2012	0.0005	0.080	EPA 524.2	75-25-2
Bromomethane	Not Detected	05/17/2012	0.001		EPA 524.2	74-83-9
Carbon tetrachloride	Not Detected	05/17/2012	0.0005	0.005	EPA 524.2	56-23-5
Chlorobenzene	Not Detected	05/17/2012	0.0005	0.1	EPA 524.2	108-90-7
Chlorodibromomethane	0.0086	05/17/2012	0.0005	0.080	EPA 524.2	124-48-1
Chloroethane	Not Detected	05/17/2012	0.0005		EPA 524.2	75-00-3
Chloroform	0.0023	05/17/2012	0.0005	0.080	EPA 524.2	67-66-3
Chloromethane	Not Detected	05/17/2012	0.0005		EPA 524.2	74-87-3
cis-1,2 Dichloroethylene	Not Detected	05/17/2012	0.0005	0.07	EPA 524.2	156-59-2
cis-1,3 Dichloropropene	Not Detected	05/17/2012	0.0005		EPA 524.2	10061-01-5
Dibromomethane	Not Detected	05/17/2012	0.0005		EPA 524.2	74-95-3
Dichlorodifluoromethane	Not Detected	05/17/2012	0.001		EPA 524.2	75-71-8
Dichloromethane	Not Detected	05/17/2012	0.0006	0.005	EPA 524.2	75-09-2
Ethylbenzene	Not Detected	05/17/2012	0.0005	0.7	EPA 524.2	100-41-4
Fluorotrichloromethane	Not Detected	05/17/2012	0.001		EPA 524.2	75-69-4
Hexachlorobutadiene	Not Detected	05/17/2012	0.0005		EPA 524.2	87-68-3
Isopropylbenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	98-82-8
m & p-Xylene	Not Detected	05/17/2012	0.0005	10	EPA 524.2	XYLMP-00-C
Methyl ethyl ketone	Not Detected	05/17/2012	0.005		EPA 524.2	78-93-3
Methyl isobutyl ketone	Not Detected	05/17/2012	0.005		EPA 524.2	108-10-1
Methyl-tert-butyl ether (MTBE)	Not Detected	05/17/2012	0.001		EPA 524.2	1634-04-4
Naphthalene	Not Detected	05/17/2012	0.0005		EPA 524.2	91-20-3
n-Butylbenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	104-51-8
Nitrobenzene	Not Detected	05/17/2012	0.01		EPA 524.2	98-95-3
n-Propylbenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	103-65-1
o-Chlorotoluene	Not Detected	05/17/2012	0.0005		EPA 524.2	95-49-8
o-Xylene	Not Detected	05/17/2012	0.0005	10	EPA 524.2	95-47-6
p-Chlorotoluene	Not Detected	05/17/2012	0.0005		EPA 524.2	106-43-4
p-Isopropyltoluene	Not Detected	05/17/2012	0.0005		EPA 524.2	99-87-6
sec-Butylbenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	135-98-8
Styrene	Not Detected	05/17/2012	0.0005	0.1	EPA 524.2	100-42-5
tert-Butylbenzene	Not Detected	05/17/2012	0.0005		EPA 524.2	98-06-6
Tetrachloroethylene	Not Detected	05/17/2012	0.0005	0.005	EPA 524.2	127-18-4
Tetrahydrofuran	Not Detected	05/17/2012	0.005		EPA 524.2	109-99-9
Toluene	Not Detected	05/17/2012	0.0005	1	EPA 524.2	108-88-3

CAS# : Chemical Abstract Service Registry Number
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mg/L : milligrams / Liter (ppm)
ppm : parts per million
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CFU : Colony Forming Unit

Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER LABORATORY
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Lansing, MI 48909
TEL: (517) 335-8184
FAX: (517) 335-8562

Sample Number
LE26411

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Volatile Organic Compounds						
Total Trihalomethanes	0.020	05/17/2012	NA	0.080	EPA 524.2	TTHM-00-C
Total Xylenes	Not Detected	05/17/2012	NA	10	EPA 524.2	1330-20-7
trans-1,2 Dichloroethylene	Not Detected	05/17/2012	0.0005	0.1	EPA 524.2	156-60-5
trans-1,3 Dichloropropene	Not Detected	05/17/2012	0.0005		EPA 524.2	10061-02-6
Trichloroethylene	Not Detected	05/17/2012	0.0005	0.005	EPA 524.2	79-01-6
Vinyl chloride	Not Detected	05/17/2012	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

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
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Laboratory Contacts
Drinking Water Unit Mgr: Julia Pieper
Systems Mgmt. Unit Mgr: George Krisztian

APPENDIX F

WTP Test Run Reports

000422

D-5a 1/86
Authority; Act 399, P.A. 1976

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

TEST RUN OPERATION REPORT
OF
WATER TREATMENT PLANT

For Month of October 2012

Flint Water Plant	2310	Genesee
NAME OF WATER SYSTEM	WSSN	COUNTY

Michael Glasgow		F-1R S-3
CERTIFIED OPERATOR		CLASSIFICATION

Michael Glasgow
SIGNATURE OF APPROPRIATE OFFICIAL

DEQ
RESOURCE MANAGEMENT DIVISION
FEB 13 2013
LANSING DISTRICT

TREATMENT RATE AND FILTER DATA

1. Treatment Rate, Maximum 12.2 Million Gallons Per Day
2. Treatment Rate, Approved Rated Plant Capacity 36 Million Gallons per Day
3. Average Filter Run 80+ Hours, Average Head Loss n/a Feet
4. Average Filtration Rate 2.4 Gallons per Square Ft. per Minute
5. Maximum Filtration Rate 3.0 Gallons per Square Ft. per Minute
6. Average Wash Water Use n/a percent of Treated Water

CHEMICAL DATA

7. Chlorine on hand _____ lbs.: Estimated supply _____ days
8. Oxygen (O2) on hand _____ lbs.: Estimated supply _____ days
9. Ferric (Fe3+) on hand _____ lbs.: Estimated supply _____ days
10. Cost of All Chemicals per Million Gallons _____
11. Total Power Cost per Million Gallons _____

Remarks:

Submit to: Mike Prysby, P.E.
MDEQ-Water Division-Lansing District
P.O. Box 30242
Lansing, MI 48909

Failure to complete this form is a violation of Act 399, P.A. 1976 and is subject to penalties as outlined in the Act.

Daily Flow & Ozone Parameters WSSN 2310 October 2012

DATE	Daily Flow (MGD)	O_3 Dosage (lbs/day)	Ozone residuals (mg/L)												Sodium Bisulfite Dosage (mg/L)
			Contact Chamber #1				Contact Chamber # 2				Contact Chamber # 3				
			# of Samples	Start (avg mg/L)	Middle (avg. mg/L)	End (avg. mg/L)	# of Samples	Start (avg mg/L)	Middle (avg. mg/L)	End (avg. mg/L)	# of Samples	Start (avg mg/L)	Middle (avg. mg/L)	End (avg. mg/L)	
1															
2															
3															
4															
5															
6															
7															
8	5.9	340	6	0.98	0.15	0.08									
9	11.4	348	9	1.10	0.28	0.10									
10	11.0	352	6	1.09	0.38	0.08									
11	10.4	340	6	1.29	0.64	0.10									
12	6.8	335	5	1.41	0.54	0.14									
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
AVG	9.1	343	6	1.17	0.40	0.10									
MAX	11.4	352	9	1.41	0.64	0.14									
MIN	5.9	335	5	0.98	0.15	0.08									
Total	45.5														

Coagulation & Flocculation Parameters WSSN 2310 October 2012

DATE	Ferric Chloride as $FeCl_3$ mg/l	Ferric Chloride as Fe 3+ mg/l	Turbidity, NTU units											
			Raw			Plate Settler Effluent			Filter Influent			Filter Effluent		
			# of Samples	Avg.	Max	# of Samples	Avg.	Max	# of Samples	Avg.	Max	# of Samples	Avg.	Max
1														
2														
3														
4														
5														
6														
7														
8	27.1	9.3	7	10.2	11.7	6	1.47	4.25	4	1.17	1.89			
9	29.4	10.1	7	8.9	10.9	9	0.56	1.30	7	0.48	0.76	2	0.18	0.25
10	27.7	9.5	6	8.5	10.7	12	0.45	0.49	6	0.48	0.67	24	0.10	0.23
11	27.8	9.6	6	7.7	8.6	11	0.57	0.87	6	0.53	0.72	24	0.09	0.11
12	28.3	9.8	5	5.6	6.3	7	0.45	0.47	5	0.47	0.52	20	0.07	0.09
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
AVG	28.1	9.7	6	8.2	9.6	9	0.70	1.48	6	0.63	0.91	18	0.11	0.17
MAX	29.4	10.1	7	10.2	11.7	12	1.47	4.25	7	1.17	1.89	24	0.18	0.25
MIN	27.1	9.3	5	5.63	6.3	6	0.45	0.47	4	0.47	0.52	2	0.07	0.09

Flouridation & Chlorination WSSN 2310 October 2012

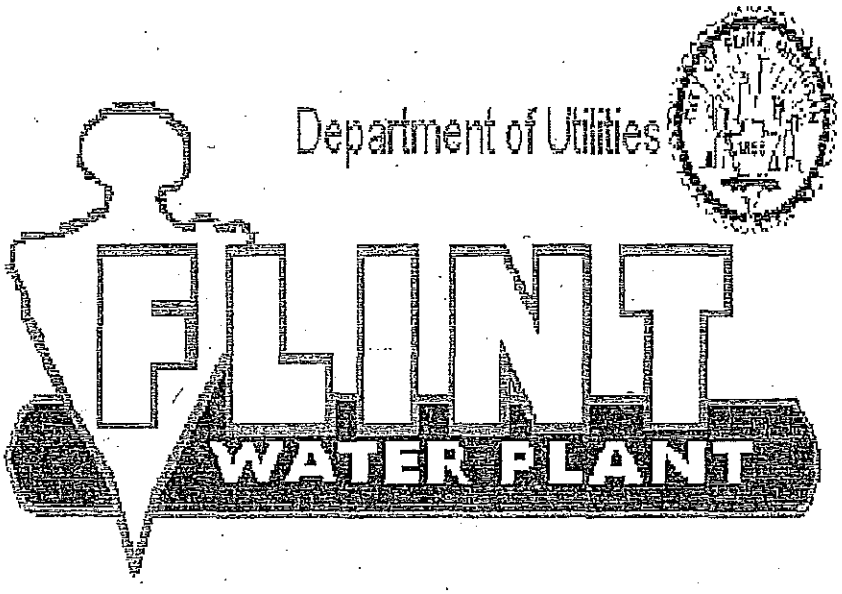
DATE	Fluoride Applied F- mg/l	Fluoride Analyses mg/l			Chlorine App. Mg/l		Chlorine Residual mg/l							
					Chlorine (prior to filtration) mg/L OCl-	Post Chlorine mg/L	Plate Settler Effluent		Contact Clairifier Effluent		Combined Filter Effluent		Combined Filter Effluent (south)	
		Raw	Filter Eff.	Dist			Free	Total	Free	Total	Free	Total	Free	Total
1														
2														
3														
4														
5														
6														
7														
8		0.21			2.8		0.6	0.8	0.2	0.5				
9		0.19	0.21		4.2		0.8	1.0	0.4	0.5	0.3	0.5	0.3	0.4
10		0.21	0.22		4.3		1.0	1.2	0.5	0.8	0.3	0.5	0.3	0.5
11		0.22	0.20		4.6		1.0	1.2	0.6	0.8	0.4	0.6	0.4	0.5
12		0.20	0.24		4.7		1.1	1.3	0.5	0.8	0.3	0.5	0.4	0.5
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
AVG		0.21	0.22		4.1		0.9	1.1	0.4	0.7	0.3	0.5	0.4	0.5
MAX		0.22	0.24		4.7		1.1	1.3	0.6	0.8	0.4	0.6	0.4	0.5
MIN		0.19	0.20		2.8		0.6	0.8	0.2	0.5	0.3	0.5	0.3	0.4

Chemical Analyses WSSN 2310 — October 2012

DATE	pH		Total Hard as $CaCO_3$ mg/l		Total Alk as $CaCO_3$ mg/l		NonCarbonate Hardness as $CaCO_3$ mg/l		Calcium Ca 2+ mg/l		Magnesium as Mg 2+ mg/l		Nitrate as NO_3- mg/l		Chloride as Cl - mg/l	
	Raw	Filter Eff.	Raw	Filter Eff.	Raw	Filter Eff.	Raw	Filter Eff.	Raw	Filter Eff.	Raw	Filter Eff.	Raw	Filter Eff.	Raw	Filter Eff.
1																
2																
3																
4																
5																
6																
7																
8	8.33		242		194		48		75.4		13.1				33	
9	8.22	7.17	240	236	194	162	46	74	83.4	81.8	7.8	7.8			35	37
10	8.30	7.37	246	244	190	154	56	90	76.2	72.1	13.6	15.6			33.5	52
11	8.49	7.34	244	236	194	152	50	84	78.6	85	11.7	5.8			38	59
12	8.35	7.38	254	238	194	156	60	82	83.4	74.5	11.2	12.6			33	52
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
AVG	8.34	7.32	245	239	193	156	52	83	79.4	78.4	11.5	10.5			35	50
MAX	8.49	7.38	254	244	194	162	60	90	83.4	85.0	13.6	15.6			38	59
MIN	8.22	7.17	240	236	190	152	46	74	75.4	72.1	7.8	5.8			33	37

Bacteriological & Physical Parameters — October 2012

DATE	Total Coliform							Standard Plate Count		Temperature (Celcius)		Color		Odor	
	Raw	Post O3	Plate Settler Eff.	Filter Inf.	Filter Eff.	Lab Tap		Raw	Filter Eff.	Raw	Tap	Raw	Tap	Raw	Tap
1															
2															
3															
4															
5															
6															
7															
8	659	2	1/0	1/0				248		13.9					
9	1553	2	5/0	5/0	8/0			>738	2	12.4					
10	>2419	1	6/1	6/0	24/0			>738	< 2	13.0					
11	1300	1	6/0	6/0	24/0			>738	< 2	11.7					
12	1300	1	5/0	5/0	20/0			>738	< 2	12.3					
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
AVG	* Raw and post-ozone coliform are most probable number maximum daily results.									12.7					
MAX	* Raw HPC counts are daily maximums.									13.9					
MIN										11.7					



PLANT OPERATION REPORT

SEPTEMBER 2009

(SEPTEMBER 8th thru SEPTEMBER 13th)

PLANT OPERATION OVERVIEW
(September 8th – 13th 2009)

Plant operation originally began on Monday, August 30th, while the 72" pipeline was being exposed. Upon exposure of the 72" pipe, it was determined that a new section of pipe was necessary too properly fix the problem. Plant operation was suspended until Tuesday, September 8th when a section of pipe was available. The plant was still partially full from the previous run when it went back in operation. The start-up intake flow on was around 12 MGD and filters we put in service the following day. The water plant went in service on Thursday, September 10th and remained in service until Saturday, September 13th when the pipeline repair was complete. Plant flow adjusted slightly during this time, but on average flow was around 13 MGD.

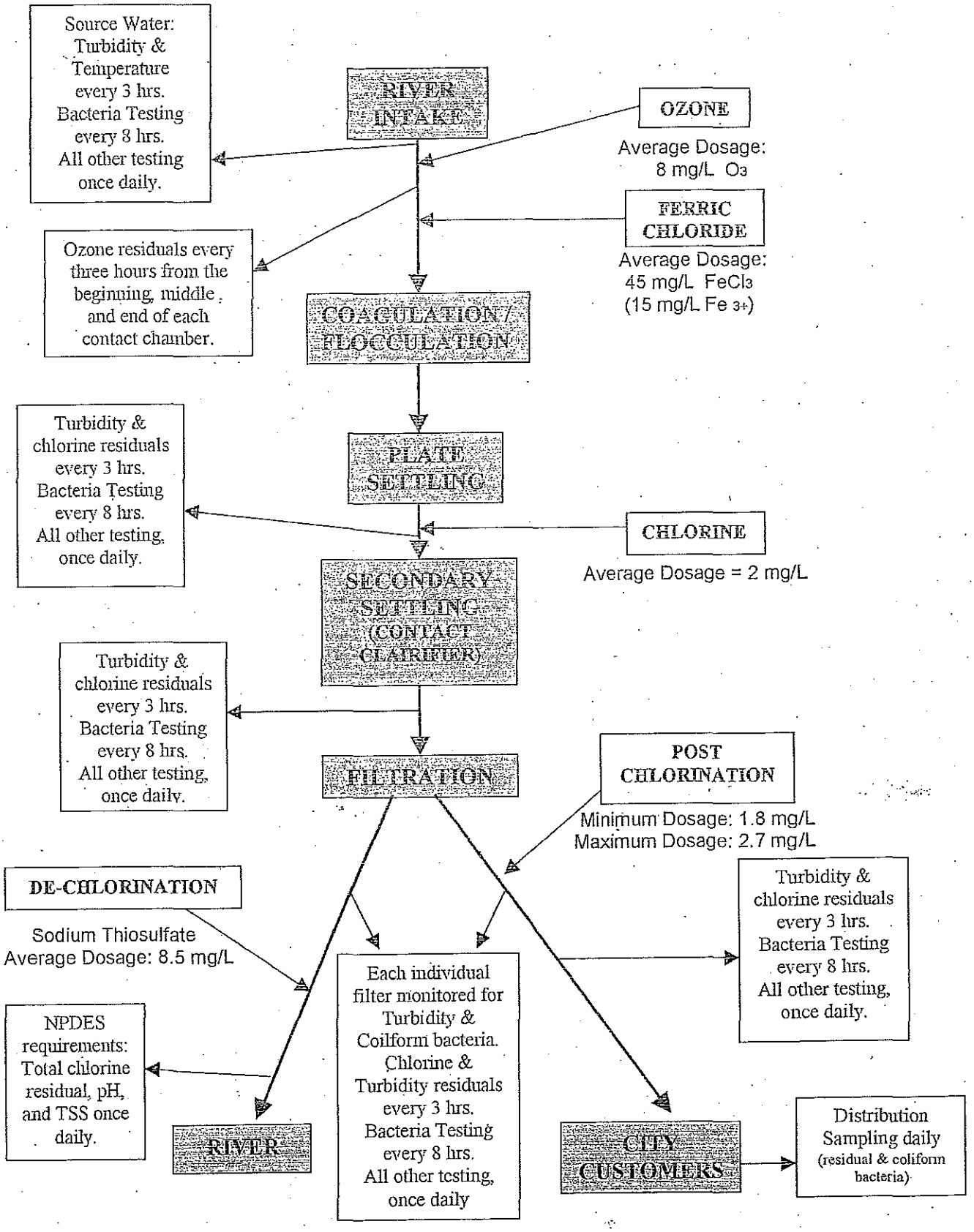
Ozone addition on average was around 8 mg/L. Residuals were observed in the beginning of the contact chambers, however, further along in the basin no residual was achieved. This has been an ongoing issue, which can only be addressed while we are in operation. Although residuals were not present throughout the process, significant bacteria reduction was observed. New programming has been performed for ozone generation, and updates are still being made to address issues that arise.

Ferric chloride dosages were on average near 45 mg/L $FeCl_3$ (15 mg/L Fe 3+). This relative dosage, along with sufficient mixing and settling produced filter influent turbidities of 0.6 NTU on average, and filter influent turbidities of less than 1 NTU after just 10 hours of operation.

Chlorine was added to plate settler effluent at a dosage of 2 mg/L. This dosage was chosen in an attempt to provide a significant microbial kill and produce a low residual in the filter effluent. As with previous testing and operation, this dosage resulted in negative coliform results in filter influent, and a free residual of 0.2 mg/L and 0.4 mg/L total. When in service, filter effluent residuals were 0.1 mg/L & 0.2 mg/L respectively, and filter turbidities were excellent with the majority of results less than 0.1 NTU. While discharging to the river, the residual was removed with a sodium thoisulfate drip, and the outfall was monitored accordingly. On average the post filtration residuals were 0.2 mg/L total chlorine. The sodium thiosulfate dosage was set high enough to remove a 1 mg/L + chlorine residual. This dosage was higher than necessary, however with our rudimentary set-up it made sense to overdose as to not have any concerns with chlorine being discharged to the river. When the plant began distributing water to the city, post chlorination in the 3 MG well (PS4) was initiated at a dosage of 2 mg/L, and was steadily increased as needed. Distribution samples were collected daily and monitored for chlorine residual & coliform bacteria while water was distributed to the residents. During the days the plant was in service no positive coliform samples appeared in the post chlorination well or in the distribution samples.

The following pages of this report include a diagram of the plant flow process, along with chemical application points and laboratory monitoring points, a copy of the September MOR with the corresponding dates highlighted, and finally, plant process operational data and related lab results.

PLANT FLOW PROCESS, CHEMICAL APPLICATIONS AND MONITORING POINTS



Coagulation Parameters **WSSN 2310** **Sep-09**

DATE	Total Million Gallons Purchased	Million Gallons to County	Million Gallons to Flint			Ferric Chloride as Fe 3+ mg/l	Turbidity, NTU units						
							Raw				Plant Tap		
							# of Samples	Avg.	Max		# of Samples	Avg.	Max
	1	1A	1B	4	5	6	7	8	9	10	11	12	13
1	25.95	12.34	13.61								3	0.11	0.12
2	25.54	12.11	13.43								3	0.15	0.18
3	26.00	12.89	13.11								3	0.16	0.17
4	26.99	13.33	13.66								3	0.22	0.26
5	24.80	13.66	11.14								3	0.17	0.17
6	25.09	13.95	11.14								3	0.12	0.13
7	24.52	12.76	11.76								3	0.13	0.15
8	25.28	13.19	12.09								3	0.14	0.15
9	14.51	13.25	1.26								3	0.15	0.17
10	12.63	12.63	0.00			15.0	8	4.82	5.44		3	0.13	0.16
11	14.43	14.43	0.00			15.8	8	5.05	6.18		3	0.13	0.15
12	13.94	13.94	0.00			14.9	8	4.45	5.31		3	0.11	0.11
13	14.85	13.49	1.36			17.2	3	4.75	5.80		3	0.26	0.41
14	32.45	14.77	17.68								3	0.35	0.37
15	34.57	14.83	19.74								3	0.29	0.40
16	33.17	13.90	19.27								3	0.27	0.33
17	26.75	13.88	12.87								3	0.24	0.33
18	28.19	14.65	13.54								3	0.12	0.14
19	28.88	15.49	13.39								3	0.12	0.12
20	29.19	14.22	14.97								3	0.12	0.13
21	29.08	13.17	15.91								3	0.14	0.16
22	28.84	12.70	16.14								3	0.15	0.17
23	28.57	12.17	16.40								3	0.11	0.13
24	25.23	11.47	13.76								3	0.13	0.13
25	25.22	10.77	14.45								3	0.14	0.14
26	24.17	11.08	13.09								3	0.13	0.14
27	22.51	10.84	11.67								3	0.11	0.11
28	22.51	10.57	11.94								3	0.10	0.10
29	28.25	10.72	17.53								3	0.13	0.14
30	27.18	10.12	17.06								3	0.15	0.15
AVG	24.98	12.91	12.07			15.7	7	4.77	5.68		3	0.16	0.18
MAX	34.57	15.49	19.74			17.2	8	5.05	6.18		3	0.35	0.41
MIN	12.63	10.12	0.00			14.9	3	4.45	5.31		3	0.10	0.10
Total	749.29	387.32	361.97										

Flouridation & Chlorination WSSN 2310

DATE	Fluoride Applied F- mg/l	Fluoride Analyses mg/l			Chlorine App. Mg/l			Chlorine Residual mg/l							
						Chlorine (prior to filtration) mg/L OCl-	Post Chlorine 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			1.12					0.9	0.9	0.7	0.8			0.9	
2			1.16					0.9	0.9	0.7	0.8			0.8	
3			1.14					0.9	0.8	0.7	0.9			0.8	
4			1.13					0.8	0.8	0.7	0.9			0.9	
5			1.11					0.8	0.7	0.7	0.8			0.8	
6			1.13					0.8	0.7	0.8	0.7			0.7	
7			1.16					0.9	0.7	0.8	0.7			0.7	
8			1.13					0.8	0.9	0.7	0.8			0.9	
9			1.16					0.9	N/A	N/A	0.8			0.8	
10		0.17	1.13			2.0	2.0	0.8	N/A	N/A	0.7			0.7	
11		0.17	0.30			1.9	2.1	0.8	N/A	N/A	1.3			0.9	
12		0.18	0.21			1.6	2.0	0.8	N/A	N/A	1.3			1.0	
13		0.18	0.20			1.9	2.6	0.8	N/A	N/A	2.9			0.9	
14			1.10					0.9	0.9	1.8	1.1			0.9	
15			1.12					0.9	0.8	1.7	1.5			0.9	
16			1.18					0.9	0.8	1.2	1.3			0.8	
17			1.18					0.8	0.8	1.2	1.1			0.8	
18			1.31					0.8	0.8	0.9	0.9			0.8	
19			1.31					0.9	0.7	0.9	0.9			0.7	
20			1.30					0.8	0.7	0.8	0.9			0.8	
21			1.30					0.9	0.7	0.9	0.9			0.8	
22			1.19					0.9	0.9	0.8	0.8			0.8	
23			1.25					0.9	0.8	0.8	0.8			0.9	
24			1.28					0.8	0.8	0.7	0.8			0.8	
25			1.25					0.8	0.8	0.7	0.8			0.8	
26			1.28					0.9	0.8	0.7	0.8			0.8	
27			1.30					0.9	0.8	0.7	0.8			0.8	
28			1.28					1.0	0.8	0.6	0.8			0.9	
29			1.24					0.9	0.8	0.7	0.8			0.8	
30			1.17					1.0	0.8	0.7	0.8			0.8	
AVG		0.18	1.10			1.9		0.9	0.8	0.9	1.0			0.8	
MAX		0.18	1.31			2.0		1.0	0.9	1.8	2.9			1.0	
MIN		0.17	0.20			1.6		0.8	0.7	0.6	0.7			0.7	

Chemical Analyses WSSN 2310

DATE	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		7.29		94		70		24				25.7		7.3		
2		7.24		94		68		26				29.7		4.9		
3		7.20		94		70		24				30.5		4.4		
4		7.23		96		70		26				29.7		5.3		
5		7.24		96		70		26				29.7		5.3		
6		7.11		98		76		22				29.7		5.8		
7		7.12		98		75		23				29.7		5.8		
8		7.23		98		68		20				28.1		6.8		
9		7.24		94		72		22				29.7		4.9		
10	8.31	7.26	210	98	178	73	32	25			71.3	30.5	13.8	5.3		
11	8.29	7.21	208	132	184	196	24	64			68.9	60.9	8.7	10.7		
12	8.22	7.12	204	142	186	212	18	70			68.9	72.9	7.8	7.3		
13	8.19	7.04	208	143	180	220	28	77			68.1	77.8	8.7	6.3		
14		7.25		75		98		23				31.3		4.9		
15		7.24		73		96		23				30.5		4.9		
16		7.20		70		94		24				30.5		4.4		
17		7.43		76		96		20				30.5		4.9		
18		7.16		74		96		22				31.3		4.4		
19		7.13		72		100		28				30.5		5.8		
20		7.19		74		98		24				28.9		6.3		
21		7.15		74		98		24				28.9		6.3		
22		7.16		72		96		24				29.7		5.3		
23		7.17		68		94		26				29.7		4.9		
24		7.22		68		94		26				29.7		4.9		
25		7.18		70		96		26				30.5		4.9		
26		7.24		70		96		26				30.5		4.9		
27		7.13		73		96		23				28.9		5.8		
28		7.29		74		98		24				28.9		6.3		
29		7.25		68		96		28				29.7		5.3		
30		7.18		73		96		23				28.9		5.8		
AVG	8.25	7.20	208	87	182	99	26	29			69.3	33.8	9.8	5.7		
MAX	8.30	7.43	210	143	186	220	32	77			71.3	77.8	13.8	10.7		
MIN	8.19	7.04	204	68	182	68	18	20			68.1	25.7	7.8	4.4		

Bacteriological & Physical Parameters WSSN 2310

DATE	Total Coliform							Standard Plate Count		Wind Direction	Temp deg.C	Color		Odor	
	Plant Tap														
	B&P		Dort	3MG Well	Pump	Lab Tap		Raw	Tap			Raw	Tap	Raw	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					19.8		0		0
2	1/0		2/0	2/0	2/0	2/0					19.7		0		0
3	1/0		2/0	2/0	2/0	2/0					19.8		0		0
4	1/0		2/0	2/0	2/0	2/0					19.9		0		0
5	1/0		2/0	2/0	2/0	2/0					19.8		0		0
6	1/0		2/0	2/0	2/0	2/0					19.9		0		0
7	1/0		2/0	2/0	2/0	2/0					20.1		0		0
8	1/0		2/0	2/0	2/0	2/0					19.8		0		0
9	1/0		0/0	2/0	0/0	2/0					20.9		0		0
10	1/0		0/0	2/0	0/0	2/0					19.6		0		0
11	1/0		2/0	6/0	2/0	2/0		1160	< 2		22.3		0		0
12	1/0		0/0	8/0	0/0	2/0		1830	< 2		22.5		0		0
13	1/0		0/0	4/0	2/0	2/0		2990	< 2		22.7		0		0
14	1/0		2/0	2/0	2/0	2/0					20.5		0		0
15	1/0		2/0	2/0	2/0	2/0					20.5		0		0
16	1/0		2/0	2/0	2/0	2/0					20.7		0		0
17	1/0		2/0	2/0	2/0	2/0					21.5		0		0
18	1/0		2/0	2/0	2/0	2/0					20.8		0		0
19	1/0		2/0	2/0	2/0	2/0					21.4		0		0
20	1/0		2/0	2/0	2/0	2/0					20.9		0		0
21	1/0		2/0	2/0	2/0	2/0					22.3		0		0
22	1/0		2/0	2/0	2/0	2/0					21.0		0		0
23	1/0		2/0	2/0	2/0	2/0					20.9		0		0
24	1/0		2/0	2/0	2/0	2/0					20.8		0		0
25	0/0		2/0	2/0	2/0	2/0					20.4		0		0
26	1/0		2/0	2/0	2/0	2/0					20.4		0		0
27	1/0		2/0	2/0	2/0	2/0					20.4		0		0
28	1/0		2/0	2/0	2/0	2/0					20.1		0		0
29	1/0		2/0	2/0	2/0	2/0					20.1		0		0
30	1/0		2/0	2/0	2/0	2/0					19.8		0		0
AVG											20.6		0		0
MAX											22.7		0		0
MIN											19.6		0		0

Distribution System Monitoring **WSSN 2310**

DATE	Free Chlorine Residual at Bacteriological Montioring Stations mg/l															
	1	2	3	4	5	6	7	8	9	10	11	CS	WR	STA II AM	STA II PM	Number of Samples
1														0.9	0.8	2
2												0.3	0.6	1.0	0.8	4
3	0.7	0.5	0.5			0.6	0.5	0.7	0.7	0.1	0.5	0.6	0.3	0.8	0.8	13
4												0.3	0.6	0.8	0.8	4
5														0.7	0.7	2
6														0.7	0.7	2
7														0.7	0.7	2
8	0.4	0.2	closed			0.5	0.3	0.4		0.2	0.4			0.8	0.9	9
9	0.4	0.3	closed			0.3	0.4	0.6	0.7	0.1	0.2			N/A	N/A	8
10	0.5	0.2	0.2						0.5		<0.1			N/A	N/A	4
11	0.4	0.2	closed			0.5	0.4	0.5	0.6	<0.1	0.2			N/A	N/A	7
12	0.4	0.2	closed			0.2	0.1	0.3	0.4	<0.1				N/A	N/A	6
13	0.2	0.3	closed			0.2	0.1	0.1	closed	0.0	closed			0.4	>3.5*	7
14	0.3	0.2	0.1			0.1	0.1	0.3	0.5	0.0	0.4	0.6	<0.1	0.9	0.8	12
15	0.8	0.4	0.4			0.7	0.5	1.7	0.8	0.3	0.6	0.7	0.7	0.8	0.8	13
16	0.5	0.3	0.4			0.6	0.5	0.9	0.6	0.1	0.5	0.7	0.7	0.7	0.8	13
17												0.6	0.7	0.8	0.8	4
18														0.7	0.9	2
19														0.7	0.7	2
20														0.7	0.7	2
21												0.7	0.4	0.7	0.7	4
22	0.6	0.4	0.5			0.6	0.5	0.7	0.7	0.3	0.5	0.5	0.4	0.9	0.9	13
23	0.6	0.4				0.6	0.4	0.5	0.8	0.1	0.5	0.3	0.6	0.7	0.8	12
24	0.5						0.3					0.4	0.5	0.8	0.7	6
25														0.8	0.8	2
26														0.8	0.8	2
27														0.8	0.8	2
28												0.3	0.2	0.8	0.8	4
29	< 0.1	0.2	0.3			0.3	0.3	0.3	0.6	< 0.1	0.4	0.7	0.3	0.8	0.8	11
30	0.4	0.4	0.4			0.5	0.5	0.5	0.7	0.1	0.4	0.3	0.7	0.8	0.8	13

Monthly Cl_2 Avg.	**0.516**
Quarterly Cl_2 Avg.	**0.604**
Yearly Cl_2 Avg.	**0.683**
Total Samples	**191**

* This sample was part of the chlroine slug that passed through after chlroination of pipeline. This water was held in dort reservoir until a true reading below 4.0 mg/L could be obtained. This value was not used in calculation of averages.

Distribution System Monitoring WSSN 2310

DATE	Total Chlorine Residual at Bacteriological Montioring Stations mg/l															
	1	2	3	4	5	6	7	8	9	10	11	CS	WR	STA II AM	STA II PM	Number of Samples
1														1.0	1.0	2
2												0.4	0.8	1.1	1.0	4
3	0.8	0.6	0.6			0.7	0.7	0.8	0.9	0.3	0.6	0.8	0.5	0.9	0.9	13
4												0.4	0.7	0.9	0.9	4
5														0.8	0.8	2
6														0.9	0.9	2
7														0.9	0.9	2
8	0.6	0.4	closed			0.6	0.4	0.5		0.3	0.6			0.9	1.0	9
9	0.5	0.4	closed			0.4	0.5	0.7	0.8	0.2	0.4			N/A	N/A	8
10	0.6	0.3	0.4						0.7		0.1			N/A	N/A	5
11	0.5	0.3	closed			0.7	0.6	0.6	0.8	0.1	0.3			N/A	N/A	8
12	0.6	0.3	closed			0.4	0.2	0.5	0.6	0.1				N/A	N/A	7
13	0.3	0.4	closed			0.4	0.3	0.2	closed	0.1	closed			0.5	>3.5*	7
14	0.5	0.3	0.2			0.2	0.2	0.5	0.7	0.2	0.5	0.7	0.2	1.0	1.2	13
15	0.9	0.5	0.5			0.8	0.6	1.9	1.0	0.4	0.8	0.9	0.8	0.9	0.9	13
16	0.7	0.4	0.6			0.8	0.7	1.1	0.8	0.3	0.7	0.9	0.9	0.9	0.9	13
17												0.7	0.8	0.9	1.0	4
18														0.9	1.0	2
19														0.9	1.0	2
20														0.8	0.9	2
21												0.8	0.5	0.9	0.9	4
22	0.8	0.5	0.6			0.8	0.6	0.8	0.8	0.4	0.6	0.6	0.5	1.0	1.0	13
23	0.8	0.5				0.7	0.5	0.7	0.9	0.2	0.6	0.5	0.8	0.9	0.9	12
24	0.6						0.5					0.5	0.5	0.9	0.9	6
25														0.9	0.9	2
26														0.9	0.9	2
27														0.9	0.9	2
28												0.4	0.4	0.9	1.0	4
29	0.1	0.4	0.5			0.5	0.5	0.5	0.8	0.1	0.5	0.9	0.5	0.9	0.9	13
30	0.5	0.5	0.5			0.7	0.6	0.1	0.9	0.2	0.6	0.4	0.9	1.0	1.0	13

Monthly Cl_2 Avg.	**0.651**
Quarterly Cl_2 Avg.	**0.729**
Yearly Cl_2 Avg.	**0.827**
Total Samples	**193**

* This sample was part of the chlroine slug that passed through after chlroination of pipeline. This water was held in dort reservoir until a true reading below 4.0 mg/L could be obtained. This value was not used in calculation of averages.

ROUTINE POSITIVE DISTRIBUTION SAMPLES

Total number of positive routine samples:				Total Coliform: 3		Fecal Coliform: 0	
Date	Monitoring Station	Total Coliform	Fecal Coliform	Date	Retest of Station, Upstream & Downstream	Total Coliform	Fecal Coliform
9/10/2009**	Dist. # 11 Salem Housing	Present	Absent	9/11/2009	Dist. # 11 Salem Housing	Absent	Absent
				9/11/2009	B&P Gas Station	Absent	Absent
				9/11/2009	Hinky Dinky Market	Absent	Absent
9/23/2009	Dist. # 1 Rite Aid	Present	Absent	9/24/2009	Dist. # 1 Rite Aid	Absent	Absent
				9/24/2009	Urban League	Absent	Absent
				9/24/2009	Kroger	Absent	Absent
9/23/2009	Dist. # 7 B&P Gas Station	Present	Absent	9/24/2009	Dist. # 7 B&P Gas Station	Absent	Absent
				9/24/2009	Advasure Insurance	Absent	Absent
				9/24/2009	Rite Aid	Absent	Absent
Total number of routine distribution samples analyzed:				187			
Total number of routine distribution samples required:				100			

** This Sample was collected from the distribution system at 10am. The Flint Water Plant went on-line at 12:30p.m.

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DATE:
9/8/2009

FLOCCULATION & SETTLING DATA

TIME	RIVER INTAKE PARAMETERS				PLATE SETTLER PARAMETERS							SOLIDS CONTACT (Secondary Settling)		
	INTAKE FLOW RATE (MGD)	TEMP (C)	TEMP (F)	TURBIDITY (NTU)	FERRIC CHLORIDE FEEDER SETTING (ml/min)	FERRIC CHLORIDE CONVERSIONS		TURBIDITY (NTU)	CHLORINE DOSAGE & RESIDUALS			TURBIDITY (NTU)	CHLORINE RESIDUALS	
						$FeCl_3$ (mg/L)	Fe^{3+} (mg/L)		Dosage (mg/L)	Free (mg/L)	Total (mg/L)		Free (mg/L)	Total (mg/L)
8:00														
9:00		21.9	71.4	4.50										
10:00														
11:00					2500									
12:00	13.0	22.4	72.3	4.51	2500	40.7	14.0	6.50	1.8	0.2	0.8	0.51	<.1	0.1
13:00	12.0				2500	44.1	15.2		2.0					
14:00	12.0				2500	44.1	15.2		2.0					
15:00	11.0	22.7	72.9	4.32	2500	48.1	16.5	1.57	2.2	0.4	0.7	2.43	0.2	0.3
16:00	11.3				2500	46.8	16.1		2.1					
17:00	11.6				2500	45.6	15.7		2.1					
18:00	10.8	23.0	73.4	4.46	2500	49.0	16.8	0.92	2.2	0.5	0.9	1.41	0.2	0.4
19:00	11.6				2500	45.6	15.7		2.1					
20:00	10.7				2500	49.4	17.0		2.2					
21:00	11.4	23.0	73.4	4.65	2500	46.4	16.0	0.72	2.1	0.6	0.8	0.930	0.2	0.4
22:00	11.8				2500	44.8	15.4		2.0					
23:00	11.7				2500	45.2	15.5		2.0					
MAXIMUM	13.0	23.0	73.4	4.65	2500	49.4	17.0	6.50	2.2	0.6	0.9	2.430	0.2	0.4
MINIMUM	10.7	21.9	71.4	4.32	2500	40.7	14.0	0.715	1.8	0.2	0.7	0.513	0.2	0.1
AVERAGE	11.6	22.6	72.7	4.49	2500	45.8	15.8	2.43	2.1	0.4	0.8	1.32	0.2	0.3

DATE:
9/9/2009

FLOCCULATION & SETTLING DATA

TIME	RIVER INTAKE PARAMETERS				PLATE SETTLER PARAMETERS							SOLIDS CONTACT (Secondary Settling)		
	INTAKE FLOW RATE (MGD)	TEMP (C)	TEMP (F)	TURBIDITY (NTU)	FERRIC CHLORIDE FEEDER SETTING (ml/min)	FERRIC CHLORIDE CONVERSIONS		TURBIDITY (NTU)	CHLORINE DOSAGE & RESIDUALS			TURBIDITY (NTU)	CHLORINE RESIDUALS	
						$FeCl_3$ (mg/L)	Fe^{3+} (mg/L)		Dosage (mg/L)	Free (mg/L)	Total (mg/L)		Free (mg/L)	Total (mg/L)
0:00	12.1	22.7	72.9	5.03	2500	43.7	15.0	0.683	2.0	0.5	0.7	0.724	0.2	0.4
1:00	11.4				2500	46.4	16.0		2.1					
2:00	12.1				2500	43.6	15.0		2.0					
3:00	12.0	22.5	72.5	5.41	2500	44.1	15.2	0.635	2.0	0.6	0.8	0.686	0.2	0.5
4:00	12.0				2500	44.0	15.1		2.0					
5:00	12.1				2500	43.6	15.0		2.0					
6:00	12.0	22.3	72.1	4.87	2500	44.2	15.2	0.891	2.0	0.5	0.7	0.707	0.2	0.4
7:00	11.9				2500	44.5	15.3		2.0					
8:00	11.9				2500	44.5	15.3		2.0					
9:00	11.9	21.9	71.4	5.52	2500	44.4	15.3	0.587	2.0	0.3	0.7	0.732	0.2	0.3
10:00	12.0				2500	44.0	15.1		2.0					
11:00	11.7				2500	45.2	15.6		2.1					
12:00	12.0	22.4	72.3	5.28	2500	44.1	15.2	0.573	2.0	0.4	0.7	0.593	0.1	0.3
13:00	12.0				2500	44.1	15.2		2.0					
14:00	12.1				2500	43.6	15.0		2.0					
15:00	11.8	22.7	72.9	5.13	2500	44.8	15.4	0.517	2.0	0.2	0.6	0.458	0.1	0.3
16:00	11.8				2500	44.7	15.4		2.0					
17:00	12.0				2500	43.9	15.1		2.0					
18:00	11.6	23.2	73.8	5.38	2500	45.5	15.7	0.545	2.1	0.8	1.1	0.535	0.2	0.4
19:00	11.8				2500	44.7	15.4		2.0					
20:00	11.5				2500	46.0	15.8		2.1					
21:00	11.9	23.0	73.4	4.96	2500	44.6	15.4	0.591	2.0	0.8	1.0	0.569	0.3	0.5
22:00	11.6				2500	45.5	15.6		2.1					
23:00	11.4				2500	46.3	15.9		2.1					
MAXIMUM	12.1	23.2	73.8	5.52	2500	46.4	16.0	0.891	2.1	0.8	1.1	0.732	0.3	0.5
MINIMUM	11.4	21.9	71.4	4.87	2500	43.6	15.0	0.517	2.0	0.2	0.6	0.458	0.1	0.3
AVERAGE	11.9	22.6	72.7	5.20	2500	44.6	15.3	0.628	2.0	0.5	0.8	0.626	0.2	0.4

DATE:
9/10/2009

FLOCCULATION & SETTLING DATA

TIME	RIVER INTAKE PARAMETERS				PLATE SETTLER PARAMETERS							SOLIDS CONTACT (Secondary Settling)		
	INTAKE FLOW RATE (MGD)	TEMP (C)	TEMP (F)	TURBIDITY (NTU)	FERRIC CHLORIDE FEEDER SETTING (ml/min)	FERRIC CHLORIDE CONVERSIONS		TURBIDITY (NTU)	CHLORINE DOSAGE & RESIDUALS			TURBIDITY (NTU)	CHLORINE RESIDUALS	
						$FeCl_3$ (mg/L)	Fe^{3+} (mg/L)		Dosage (mg/L)	Free (mg/L)	Total (mg/L)		Free (mg/L)	Total (mg/L)
0:00	11.5	22.8	73.0	4.89	2600	47.7	16.4	0.515	2.1	0.7	0.9	0.481	0.4	0.5
1:00	11.7				2500	45.1	15.5		2.0					
2:00	11.9				2500	44.5	15.3		2.0					
3:00	11.8	22.8	73.0	5.02	2500	45.0	15.5	0.465	2.0	0.7	0.9	0.427	0.3	0.5
4:00	11.9				2500	44.6	15.3		2.0					
5:00	11.9				2500	44.3	15.2		2.0					
6:00	11.8	22.7	72.9	5.23	2500	44.9	15.4	0.404	2.0	0.8	0.9	0.424	0.4	0.5
7:00	11.6				2500	45.5	15.7		2.1					
8:00	12.0				2500	44.0	15.1		2.0					
9:00	11.8	22.6	72.7	5.15	2500	45.0	15.5	0.430	2.0	0.5	0.9	0.435	0.3	0.5
10:00	11.8				2500	44.7	15.4		2.0					
11:00	11.7				2500	45.2	15.6		2.1					
12:00	11.7	22.9	73.2	5.44	2600	46.9	16.1	0.421	2.0	0.6	0.8	0.425	0.1	0.3
13:00	12.1				2600	45.3	15.6		2.0					
14:00	12.5				2500	42.4	14.6		1.9					
15:00	11.8	23.4	74.1	4.72	2500	44.7	15.4	0.471	2.0	2.2	2.3	0.405	0.3	0.6
16:00	11.7				2500	45.3	15.6		2.1	2.3	2.5			
17:00	12.5				2500	42.4	14.6		1.9					
18:00	13.7	23.7	74.7	3.86	2500	38.5	13.2	0.750	1.7	1.3	1.5	0.451	1.1	1.3
19:00	13.2				2500	40.0	13.8		1.8					
20:00	13.6				2500	39.0	13.4		1.8					
21:00	13.5	23.3	73.9	4.23	2500	39.1	13.4	1.09	1.8	1.2	1.5	0.638	1.0	1.2
22:00	13.8				2700	41.4	14.2		1.7					
23:00	13.3				2700	43.1	14.8		1.8					
MAXIMUM	13.8	23.7	74.7	5.44	2700	47.7	16.4	1.09	2.1	2.3	2.5	0.638	1.1	1.3
MINIMUM	11.5	22.6	72.7	3.86	2500	38.5	13.2	0.404	1.7	0.5	0.8	0.405	0.1	0.3
AVERAGE	12.3	23.0	73.4	4.82	2529	43.7	15.0	0.568	2.0	1.1	1.4	0.461	0.5	0.7

DATE:
9/11/2009

FLOCCULATION & SETTLING DATA

TIME	RIVER INTAKE PARAMETERS				PLATE SETTLER PARAMETERS							SOLIDS CONTACT (Secondary Settling)		
	INTAKE FLOW RATE (MGD)	TEMP (C)	TEMP (F)	TURBIDITY (NTU)	FERRIC CHLORIDE FEEDER SETTING (ml/min)	FERRIC CHLORIDE CONVERSIONS		TURBIDITY (NTU)	CHLORINE DOSAGE & RESIDUALS			TURBIDITY (NTU)	CHLORINE RESIDUALS	
						FeCl3 (mg/L)	Fe 3+ (mg/L)		Dosage (mg/L)	Free (mg/L)	Total (mg/L)		Free (mg/L)	Total (mg/L)
0:00	13.8	23.3	73.9	4.52	2700	41.5	14.3	0.487	1.7	1.1	1.3	0.512	0.6	0.8
1:00	13.6				2700	42.0	14.5		1.8					
2:00	13.3				2700	42.8	14.7		1.8					
3:00	13.6	23.5	74.3	4.31	2700	41.9	14.4	0.554	1.8	1.1	1.3	0.466	0.5	0.7
4:00	11.9				2700	48.0	16.5		2.0					
5:00	11.8				2800	50.4	17.3		2.0					
6:00	11.5	23.3	73.9	4.07	2700	49.7	17.1	0.430	2.1	1.2	1.4	0.475	0.7	0.9
7:00	11.1				2700	51.3	17.7		2.2					
8:00	11.2				2700	50.9	17.5		2.1					
9:00	13.3	23.0	73.4	4.58	2700	42.8	14.7	0.395	1.8	0.5	0.8	0.432	0.2	0.5
10:00	13.2				2700	43.4	14.9		1.8					
11:00	13.3				2800	44.5	15.3		1.8					
12:00	13.2	23.1	73.6	6.18	2700	43.2	14.8	0.533	1.8	0.3	0.6	0.450	0.2	0.3
13:00	15.1				2800	39.2	13.5		1.6					
14:00	15.3				2800	38.8	13.4		1.6					
15:00	6.9	23.3	73.9	5.43	2700	82.6	28.4	0.659	3.5	0.4	0.6	0.504	0.1	0.3
16:00	15.2				2800	39.0	13.4		1.6	0.1	0.3			
17:00	15.2				2800	39.0	13.4		1.6					
18:00	15.1	23.6	74.5	5.90	2700	37.8	13.0	0.624	1.6	0.3	0.6	0.667	0.2	0.3
19:00	15.0				2800	39.5	13.6		1.6					
20:00	15.1				2800	39.3	13.5		1.6	2.2	2.6			
21:00	14.9	23.3	73.9	5.40	2800	39.6	13.6	0.562	1.6	1.0	1.2	0.638	0.5	0.6
22:00	15.0				2700	30.1	13.1		1.6	0.9	1.1			
23:00	7.4				2700	77.6	26.7		3.3					
MAXIMUM	15.3	23.6	74.5	6.18	2800	82.6	28.4	0.659	3.5	2.2	2.6	0.667	0.7	0.9
MINIMUM	6.9	23.0	73.4	4.07	2700	37.8	13.0	0.395	1.6	0.1	0.3	0.432	0.1	0.3
AVERAGE	13.1	23.3	73.9	5.05	2738	46.0	15.8	0.531	1.9	0.8	1.1	0.518	0.4	0.6

DATE:
9/12/2009

FLOCCULATION & SETTLING DATA

TIME	RIVER INTAKE PARAMETERS				PLATE SETTLER PARAMETERS							SOLIDS CONTACT (Secondary Settling)		
					FERRIC CHLORIDE FEEDER SETTING	FERRIC CHLORIDE CONVERSIONS		TURBIDITY	CHLORINE DOSAGE & RESIDUALS			TURBIDITY	CHLORINE RESIDUALS	
	INTAKE FLOW RATE (MGD)	TEMP (C)	TEMP (F)	TURBIDITY (NTU)	(ml/min)	$FeCl_3$ (mg/L)	Fe^{3+} (mg/L)	(NTU)	Dosage (mg/L)	Free (mg/L)	Total (mg/L)	(NTU)	Free (mg/L)	Total (mg/L)
0:00	15.1	23.1	73.6	4.98	2800	39.2	13.5	0.626	1.6	0.7	0.9	0.541	0.4	0.6
1:00	15.9				2700	36.0	12.4		1.5					
2:00	13.3				2800	44.5	15.3		1.8					
3:00	15.7	22.9	73.2	5.31	3000	40.5	13.9	0.656	1.5	0.6	0.8	0.535	0.2	0.4
4:00	14.8				3000	42.9	14.8		1.6					
5:00	15.2				3000	41.7	14.4		1.6					
6:00	15.0	22.9	73.2	4.50	3000	42.2	14.5	0.643	1.6	0.3	0.5	0.608	0.1	0.4
7:00	15.7				3000	40.3	13.9		1.5					
8:00	16.3				3000	38.9	13.4		1.5					
9:00	16.4	22.7	72.9	3.50	3000	38.7	13.3	0.429	1.5	0.4	0.5	0.487	0.1	0.4
10:00	16.3				3000	38.9	13.4		1.5					
11:00	16.2				3000	39.2	13.5		1.5					
12:00	16.3	23.0	73.4	2.98	3000	39.0	13.4	0.580	1.5	0.3	0.4	0.476	0.1	0.4
13:00	16.1				3000	39.3	13.5		1.5					
14:00	16.3				3000	38.9	13.4		1.5	0.3	0.6			
15:00	16.0	23.5	74.3	4.41	3000	39.7	13.6	0.529	1.5	0.3	0.5	0.484	0.1	0.3
16:00	9.9				3000	64.3	22.1		2.4	0.3	0.5			
17:00	11.3				3000	56.2	19.3		2.1	0.3	0.4			
18:00	9.8	23.7	74.7	4.79	3000	65.1	22.4	0.695	2.5	0.3	0.6	0.622	0.2	0.3
19:00	16.0				3000	39.7	13.6		1.5	0.3	0.4			
20:00	16.1				N.R.	N/A	N/A		1.5	0.4	0.7			
21:00	N.R.	23.1	73.6	5.13	N.R.	N/A	N/A	0.496		0.1	0.3	0.557	0.1	0.2
22:00	N.R.				N.R.	N/A	N/A							
23:00	N.R.				N.R.	N/A	N/A							
MAXIMUM	16.4	23.7	74.7	5.31	3000	65.1	22.4	0.695	2.5	0.7	0.9	0.622	0.4	0.6
MINIMUM	9.8	22.7	72.9	2.98	2700	36.0	12.4	0.429	1.5	0.1	0.3	0.476	0.1	0.2
AVERAGE	14.9	23.1	73.6	4.45	2965	43.3	14.9	0.582	1.6	0.4	0.5	0.539	0.2	0.4

DATE:
9/13/2009

FLOCCULATION & SETTLING DATA

TIME	RIVER INTAKE PARAMETERS				PLATE SETTLER PARAMETERS							SOLIDS CONTACT (Secondary Settling)		
	INTAKE FLOW RATE (MGD)	TEMP (C)	TEMP (F)	TURBIDITY (NTU)	FERRIC CHLORIDE FEEDER SETTING (ml/min)	FERRIC CHLORIDE CONVERSIONS		TURBIDITY (NTU)	CHLORINE DOSAGE & RESIDUALS			TURBIDITY (NTU)	CHLORINE RESIDUALS	
						$FeCl_3$ (mg/L)	Fe^{3+} (mg/L)		Dosage (mg/L)	Free (mg/L)	Total (mg/L)		Free (mg/L)	Total (mg/L)
0:00	11.7	23.0	73.4	4.27	3000	54.2	18.7	0.441	2.0	0.3	0.4	0.503	0.2	0.3
1:00	11.8				3000	53.8	18.5		2.0					
2:00	11.7				3000	54.3	18.7		2.1	0.2	0.3			
3:00	11.6	22.9	73.2	4.18	3000	54.6	18.8	0.358	2.1	1.6	2.2	0.443	0.2	0.3
4:00	11.6				3000	54.6	18.8		2.1					
5:00	11.7				3000	54.4	18.7		2.1					
6:00	15.4				3000	41.2	14.2		1.6	0.2	0.3		1.1	1.5
7:00	15.5				3000	41.0	14.1		1.6					
8:00	15.6				3000	40.8	14.0		1.5	< 0.1	< 0.1		< 0.1	< 0.1
9:00	N.R.	22.3	72.1	5.80	OFF			0.407				0.323		
10:00	N.R.				OFF									
11:00	N.R.				OFF									
MAXIMUM	15.6	23.0	73.4	5.80	3000	54.6	18.8	0.441	2.1	1.6	2.2	0.503	1.1	1.5
MINIMUM	11.6	22.3	72.1	4.18	3000	40.8	14.0	0.358	1.5	0.2	0.3	0.323	0.2	0.3
AVERAGE	12.9	22.7	72.9	4.75	3000	49.9	17.2	0.402	1.9	0.6	0.8	0.423	0.5	0.7

DATE:
9/8/2009

WATER PLANT LABORATORY DATA - OZONE

TIME	INTAKE FLOW RATE (MGD)	O_3 DOSAGES		OZONE RESIDUALS								
		O_3 (lbs/day)	O_3 (mg/L)	CHAMBER 1 Residual # 1 (mg/L)	CHAMBER 1 Residual # 2 (mg/L)	CHAMBER 1 Residual # 3 (mg/L)	CHAMBER 2 Residual # 4 (mg/L)	CHAMBER 2 Residual # 5 (mg/L)	CHAMBER 2 Residual # 6 (mg/L)	CHAMBER 3 Residual # 7 (mg/L)	CHAMBER 3 Residual # 8. (mg/L)	CHAMBER 3 Residual # (mg/L)
12:00	13.0	930	8.6	0.21	0.00	N/A	0.29	0.00	N/A	0.56	0.00	N/A
13:00	12.0	1101	11.0									
14:00	12.0	1073	10.7									
15:00	11.0	994	10.8	0.23	0.02	N/A	0.41	0.00	N/A	0.42	0.00	N/A
16:00	11.3	999	10.6									
17:00	11.6	1000	10.3									
18:00	10.8	998	11.1	0.17	0.00	N/A	0.43	0.00	N/A	0.44	0.00	N/A
19:00	11.6	1015	10.5									
20:00	10.7	987	11.1									
21:00	11.4	997	10.5	0.25	0.00	N/A	0.30	0.00	N/A	0.63	0.00	N/A
22:00	11.8	1003	10.2									
23:00	11.7	987	10.1									
MAXIMUM	13.0	1101	11.1	0.25	0.02	N/A	0.43	0.00	N/A	0.63	0.00	N/A
MINIMUM	10.7	930	8.6	0.17	0.00	N/A	0.29	0.00	N/A	0.42	0.00	N/A
AVERAGE	11.6	1007	10.5	0.22	0.01	N/A	0.36	0.00	N/A	0.51	0.00	N/A

DATE:

9/9/2009

WATER PLANT LABORATORY DATA - OZONE

TIME	INTAKE FLOW RATE (MGD)	O_3 DOSAGES		OZONE RESIDUALS								
		O_3 (lbs/day)	O_3 (mg/L)	CHAMBER 1 Residual # 1 (mg/L)	CHAMBER 1 Residual # 2 (mg/L)	CHAMBER 1 Residual # 3 (mg/L)	CHAMBER 2 Residual # 4 (mg/L)	CHAMBER 2 Residual # 5 (mg/L)	CHAMBER 2 Residual # 6 (mg/L)	CHAMBER 3 Residual # 7 (mg/L)	CHAMBER 3 Residual # 8 (mg/L)	CHAMBER 3 Residual # (mg/L)
0:00	12.1	960	9.5	0.15	0.00	N/A	0.37	0.00	N/A	0.35	0.00	N/A
1:00	11.4	1000	10.5									
2:00	12.1	1012	10.0									
3:00	12.0	998	10.0	0.23	0.00	N/A	0.42	0.00	N/A	0.26	0.00	N/A
4:00	12.0	988	9.9									
5:00	12.1	1003	9.9									
6:00	12.0	983	9.8	0.18	0.00	N/A	0.22	0.00	N/A	0.25	0.00	N/A
7:00	11.9	963	9.7									
8:00	11.9	981	9.9									
9:00	11.9	970	9.8	0.10	0.00	N/A	0.27	0.00	N/A	0.29	0.00	N/A
10:00	12.0	967	9.7									
11:00	11.7	1002	10.3									
12:00	12.0	991	9.9	0.14	0.00	N/A	0.05	0.00	N/A	0.25	0.00	N/A
13:00	12.0	990	9.9									
14:00	12.1	984	9.7									
15:00	11.8	988	10.0	0.29	0.00	N/A	0.50	0.00	N/A	0.51	0.00	N/A
16:00	11.8	996	10.1									
17:00	12.0	987	9.8									
18:00	11.6	1004	10.4	0.12	0.00	N/A	0.38	0.00	N/A	0.61	0.00	N/A
19:00	11.8	1001	10.1									
20:00	11.5	973	10.2									
21:00	11.9	970	9.8	0.42	0.00	N/A	0.24	0.00	N/A	0.44	0.00	N/A
22:00	11.6	985	10.2									
23:00	11.4	1002	10.5									
MAXIMUM	12.1	1012	10.5	0.42	0.00	N/A	0.50	0.00	N/A	0.61	0.00	N/A
MINIMUM	11.4	960	9.5	0.10	0.00	N/A	0.05	0.00	N/A	0.25	0.00	N/A
AVERAGE	11.9	987	10.0	0.20	0.00	N/A	0.31	0.00	N/A	0.37	0.00	N/A

DATE:

9/10/2009

WATER PLANT LABORATORY DATA - OZONE

TIME	INTAKE FLOW RATE (MGD)	O_3 DOSAGES		OZONE RESIDUALS								
		O_3 (lbs/day)	O_3 (mg/L)	CHAMBER 1 Residual # 1 (mg/L)	CHAMBER 1 Residual # 2 (mg/L)	CHAMBER 1 Residual # 3 (mg/L)	CHAMBER 2 Residual # 4 (mg/L)	CHAMBER 2 Residual # 5 (mg/L)	CHAMBER 2 Residual # 6 (mg/L)	CHAMBER 3 Residual # 7 (mg/L)	CHAMBER 3 Residual # 8 (mg/L)	CHAMBER 3 Residual # (mg/L)
0:00	11.5	1001	10.4	0.27	0.00	N/A	0.23	0.00	N/A	0.29	0.00	N/A
1:00	11.7	998	10.2									
2:00	11.9	973	9.8									
3:00	11.8	1012	10.3	0.33	0.00	N/A	0.24	0.00	N/A	0.35	0.00	N/A
4:00	11.9	1027	10.4									
5:00	11.9	958	9.6									
6:00	11.8	994	10.1	0.21	0.00	N/A	0.26	0.00	N/A	0.33	0.00	N/A
7:00	11.6	983	10.1									
8:00	12.0	933	9.3									
9:00	11.8	974	9.9	0.38	0.00	N/A	0.46	0.00	N/A	0.43	0.00	N/A
10:00	11.8	941	9.5									
11:00	11.7	920	9.4									
12:00	11.7	933	9.5	0.31	0.00	N/A	0.27	0.00	N/A	0.50	0.00	N/A
13:00	12.1	964	9.5									
14:00	12.5	957	9.2									
15:00	11.8	968	9.8	0.14	0.00	N/A	0.00	N/A	N/A	0.40	0.00	N/A
16:00	11.7	995	10.2									
17:00	12.5	985	9.5									
18:00	13.7	1004	8.8	0.10	0.00	N/A	0.10	0.00	N/A	0.01	0.00	N/A
19:00	13.2	956	8.7									
20:00	13.6	1034	9.1									
21:00	13.5	951	8.4									
22:00	13.8	953	8.3									
23:00	13.3	1017	9.2									
MAXIMUM	13.8	1034	10.4	0.38	0.00	N/A	0.46	0.00	N/A	0.50	0.00	N/A
MINIMUM	11.5	920	8.3	0.10	0.00	N/A	0.00	0.00	N/A	0.01	0.00	N/A
AVERAGE	12.3	976	9.6	0.25	0.00	N/A	0.22	0.00	N/A	0.33	0.00	N/A

DATE:

9/11/2009

WATER PLANT LABORATORY DATA - OZONE

TIME	INTAKE FLOW RATE (MGD)	O_3 DOSAGES		OZONE RESIDUALS								
		O_3 (lbs/day)	O_3 (mg/L)	CHAMBER 1 Residual # 1 (mg/L)	CHAMBER 1 Residual # 2 (mg/L)	CHAMBER 1 Residual # 3 (mg/L)	CHAMBER 2 Residual # 4 (mg/L)	CHAMBER 2 Residual # 5 (mg/L)	CHAMBER 2 Residual # 6 (mg/L)	CHAMBER 3 Residual # 7 (mg/L)	CHAMBER 3 Residual # 8 (mg/L)	CHAMBER 3 Residual # (mg/L)
0:00	13.8	977	8.5	0.09	0.00	N/A	0.11	0.00	N/A	0.09	0.00	N/A
1:00	13.6	996	8.8									
2:00	13.3	930	8.4									
3:00	13.6	934	8.2	0.19	0.00	N/A	0.44	0.00	N/A	0.31	0.00	N/A
4:00	11.9	941	9.5									
5:00	11.8	983	10.0									
6:00	11.5	1000	10.4	0.59	0.00	N/A	0.30	0.00	N/A	0.42	0.00	N/A
7:00	11.1	956	10.3									
8:00	11.2	993	10.6									
9:00	13.3	982	8.8	0.02	0.00	N/A	0.09	0.00	N/A	0.11	0.00	N/A
10:00	13.2	977	8.9									
11:00	13.3	950	8.6									
12:00	13.2	951	8.6	0.12	0.00	N/A	0.05	0.00	N/A	0.02	0.00	N/A
13:00	15.1	964	7.6									
14:00	15.3	907	7.1									
15:00	6.9	999	17.3	0.01	N/A	N/A	0.12	0.00	N/A	0.14	0.00	N/A
16:00	15.2	991	7.8									
17:00	15.2	964	7.6									
18:00	15.1	970	7.7	0.02	N/A	N/A	0.30	0.00	N/A	0.49	0.00	N/A
19:00	15.0	971	7.8									
20:00	15.1	958	7.6									
21:00	14.9	968	7.8	0.13	0.00	NA	0.00	N/A	N/A	0.19	0.00	N/A
22:00	15.0	953	7.6									
23:00	7.4	970	15.8									
MAXIMUM	15.3	1000	17.3	0.59	0.00	N/A	0.44	0.00	N/A	0.49	0.00	N/A
MINIMUM	6.9	907	7.1	0.01	0.00	N/A	0.00	0.00	N/A	0.02	0.00	N/A
AVERAGE	13.1	966	9.2	0.15	0.00	N/A	0.18	0.00	N/A	0.22	0.00	N/A

DATE:

9/12/2009

WATER PLANT LABORATORY DATA - OZONE

TIME	INTAKE FLOW RATE (MGD)	O_3 DOSAGES		OZONE RESIDUALS								
		O_3 (lbs/day)	O_3 (mg/L)	CHAMBER 1 Residual # 1 (mg/L)	CHAMBER 1 Residual # 2 (mg/L)	CHAMBER 1 Residual # 3 (mg/L)	CHAMBER 2 Residual # 4 (mg/L)	CHAMBER 2 Residual # 5 (mg/L)	CHAMBER 2 Residual # 6 (mg/L)	CHAMBER 3 Residual # 7 (mg/L)	CHAMBER 3 Residual # 8 (mg/L)	CHAMBER 3 Residual # (mg/L)
0:00	15.1	969	7.7	0.01	N/A	N/A	0.00	N/A	N/A	0.17	N/A	N/A
1:00	15.9	1001	7.6									
2:00	13.3	975	8.8									
3:00	15.7	966	7.4	0.04	N/A	N/A	0.00	N/A	N/A	0.13	N/A	N/A
4:00	14.8	955	7.7									
5:00	15.2	984	7.8									
6:00	15.0	974	7.8	0.01	N/A	N/A	0.00	N/A	N/A	0.11	N/A	N/A
7:00	15.7	957	7.3									
8:00	16.3	954	7.0									
9:00	16.4	945	6.9	0.22	0.00	N/A	0.17	0.00	N/A	0.28	0.00	N/A
10:00	16.3	978	7.2									
11:00	16.2	970	7.2									
12:00	16.3	979	7.2	0.23	0.00	N/A	0.15	0.00	N/A	0.09	0.00	N/A
13:00	16.1	967	7.2									
14:00	16.3	980	7.2									
15:00	16.0	963	7.2	0.08	0.00	N/A	0.03	0.00	N/A	0.41	0.00	N/A
16:00	9.9	959	11.7									
17:00	11.3	967	10.3									
18:00	9.8	962	11.8	0.06	0.00	N/A	0.17	0.00	N/A	0.20	0.00	N/A
19:00	16.0	977	7.3									
20:00	16.1	959	7.1									
21:00	N.R.	N.R.	N/A	0.28	0.00	N/A	0.31	0.00	N/A	0.35	0.00	N/A
22:00	N.R.	N.R.	N/A									
23:00	N.R.	N.R.	N/A									
MAXIMUM	16.4	1001	11.83	0.28	0.00	N/A	0.31	0.00	N/A	0.41	0.00	N/A
MINIMUM	9.8	945	6.91	0.01	0.00	N/A	0.00	0.00	N/A	0.09	0.00	N/A
AVERAGE	14.9	969	7.97	0.12	0.00	N/A	0.10	0.00	N/A	0.22	0.00	N/A

DATE:

9/13/2009

WATER PLANT LABORATORY DATA - OZONE

TIME	INTAKE FLOW RATE (MGD)	O_3 DOSAGES		OZONE RESIDUALS								
		O_3 (lbs/day)	O_3 (mg/L)	CHAMBER 1 Residual # 1 (mg/L)	CHAMBER 1 Residual # 2 (mg/L)	CHAMBER 1 Residual # 3 (mg/L)	CHAMBER 2 Residual # 4 (mg/L)	CHAMBER 2 Residual # 5 (mg/L)	CHAMBER 2 Residual # 6 (mg/L)	CHAMBER 3 Residual # 7 (mg/L)	CHAMBER 3 Residual # 8 (mg/L)	CHAMBER 3 Residual # (mg/L)
0:00	11.7	947	9.7	0.71	0.02	0.00	0.58	0.00	N/A	0.79	0.01	0.00
1:00	11.6	954	9.7									
2:00	11.7	950	9.7									
3:00	11.6	976	10.1	0.56	0.00	N/A	0.67	0.00	N/A	0.81	0.00	N/A
4:00	11.6	976	10.1									
5:00	11.7	977	10.0									
6:00	15.4	971	7.6									
7:00	15.5	996	7.7									
8:00	15.6	1001	7.7									
9:00	N.R.	N.R.	N/A	0.43	0.00	N/A	0.31	0.00	N/A	0.54	0.00	N/A

MAXIMUM	15.6	1001	10.1	0.71	0.02	N/A	0.67	0.00	N/A	0.81	0.01	N/A
MINIMUM	11.6	947	7.6	0.43	0.00	N/A	0.31	0.00	N/A	0.54	0.00	N/A
AVERAGE	12.9	972	9.1	0.57	0.01	N/A	0.52	0.00	N/A	0.71	0.00	N/A

INDIVIDUAL FILTER DATA

(9/9/09)

TIME	FILTER # 7				FILTER # 8				FILTER # 9				FILTER # 10			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00								0.185				0.184				
1:00																
2:00																
3:00																
4:00				0.243				0.242				0.232				0.239
5:00																
6:00				0.268				0.276				0.271				0.279
7:00																
8:00																
9:00				0.293				0.296				0.279				0.289
10:00																
11:00	1170	1.7	0.197		1246	1.8	0.186		1384	2.0	0.189		1472	2.1	0.188	
12:00	1163	1.7	0.173	0.182	1244	1.8	0.158	0.173	1377	2.0	0.164	0.186	1462	2.1	0.159	0.198
13:00	1170	1.7	0.146		1231	1.8	0.136		1388	2.0	0.137		1483	2.1	0.137	
14:00	1169	1.7	0.103		1222	1.7	0.134		1372	2.0	0.130		1477	2.1	0.135	
15:00	1175	1.7	0.088	0.176	1251	1.8	0.083	0.113	1390	2.0	0.084	0.108	1484	2.1	0.084	0.149
16:00	1177	1.7	0.084		1254	1.8	0.073		1391	2.0	0.074		1488	2.1	0.075	
17:00	1165	1.7	0.069		1244	1.8	0.064		1394	2.0	0.065		1480	2.1	0.066	
18:00	1172	1.7	0.070	0.098	1247	1.8	0.060	0.092	1390	2.0	0.061	0.112	1445	2.1	0.062	0.136
19:00	1177	1.7	0.068		1254	1.8	0.058		1391	2.0	0.059		1458	2.1	0.060	
20:00	1175	1.7	0.067		1265	1.8	0.056		1397	2.0	0.058		1491	2.1	0.059	
21:00	1185	1.7	0.066	0.147	1270	1.8	0.055	0.108	1416	2.0	0.057	0.129	1492	2.1	0.058	0.132
22:00	1203	1.7	0.066		1283	1.8	0.055		1417	2.0	0.056		1519	2.2	0.057	
23:00	1206	1.7	0.065		1287	1.8	0.054		1430	2.0	0.056		1510	2.2	0.057	
# of SAMPLES	13	13	13	7	13	13	13	8	13	13	13	8	13	13	13	7
MAXIMUM	1206	1.7	0.197	0.293	1287	1.8	0.186	0.296	1430	2.0	0.189	0.279	1519	2.2	0.188	0.289
MINIMUM	1163	1.7	0.065	0.098	1222	1.7	0.054	0.092	1372	2.0	0.056	0.108	1445	2.1	0.057	0.132
AVERAGE	1177	1.7	0.097	0.201	1254	1.8	0.090	0.146	1395	2.0	0.092	0.185	1482	2.1	0.092	0.203

INDIVIDUAL FILTER DATA

(9/9/09)

TIME	FILTER # 11				FILTER # 12				COMBINED FILTER EFFLUENT # 1 (filters #7,9,&11)				COMBINED FILTER EFFLUENT # 2 (filters #8,10,&12)			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00								0.196								
1:00																
2:00																
3:00																
4:00				0.245				0.239								
5:00																
6:00				0.295				0.212								
7:00																
8:00																
9:00				0.293				0.292								
10:00																
11:00	1059	1.5	0.206		1419	2.0	0.193									
12:00	1061	1.5	0.174	0.195	1427	2.0	0.167	0.177								
13:00	1066	1.5	0.151		1432	2.0	0.140									
14:00	1073	1.5	0.148		1424	2.0	0.130									
15:00	1060	1.5	0.092	0.165	1436	2.1	0.086	0.191								
16:00	1066	1.5	0.081		1424	2.0	0.075									
17:00	1068	1.5	0.070		1434	2.0	0.065									
18:00	1065	1.5	0.065	0.127	1430	2.0	0.061	0.130								
19:00	1070	1.5	0.063		1420	2.0	0.059									
20:00	1074	1.5	0.062		1430	2.0	0.057									
21:00	1092	1.6	0.060	0.142	1452	2.1	0.056	0.134								
22:00	1099	1.6	0.060		1472	2.1	0.056									
23:00	1104	1.6	0.059		1470	2.1	0.055									
									*Only applicable if water is distributed to residents, due to placement of sample tap.				*Only applicable if water is distributed to residents, due to placement of sample tap.			
# of SAMPLES	13	13	13	7	13	13	13	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MAXIMUM	1104	1.6	0.206	0.295	1472	2.1	0.193	0.202	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MINIMUM	1059	1.5	0.059	0.127	1419	2.0	0.055	0.130	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AVERAGE	1074	1.5	0.099	0.209	1437	2.1	0.092	0.196	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

INDIVIDUAL FILTER DATA

(9/10/09)

TIME	FILTER # 7				FILTER # 8				FILTER # 9				FILTER # 10			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1276	1.8	0.064	0.080	1559	2.2	0.054	0.088	1556	2.2	0.055	0.082	1543	2.2	0.056	0.087
1:00	1271	1.8	0.064		1562	2.2	0.053		1543	2.2	0.055		1537	2.2	0.055	
2:00	1243	1.8	0.063		1492	2.1	0.053		1507	2.2	0.055		1446	2.1	0.055	
3:00	1228	1.8	0.063	0.074	1483	2.1	0.053	0.082	1599	2.3	0.054	0.079	1443	2.1	0.055	0.071
4:00	1217	1.7	0.062		1487	2.1	0.053		1434	2.0	0.054		1424	2.0	0.055	
5:00	1220	1.7	0.062		1488	2.1	0.052		1489	2.1	0.053		1421	2.0	0.054	
6:00	1210	1.7	0.061	0.081	1481	2.1	0.052	0.083	1498	2.1	0.053	0.074	1429	2.0	0.053	0.076
7:00	1212	1.7	0.061		1490	2.1	0.052		1492	2.1	0.053		1420	2.0	0.053	
8:00	1203	1.7	0.060		1491	2.1	0.051		1466	2.1	0.052		1416	2.0	0.053	
9:00	1201	1.7	0.060	0.083	1471	2.1	0.051	0.136	1465	2.1	0.052	0.116	1415	2.0	0.053	0.089
10:00	1212	1.7	0.060		1489	2.1	0.051		1491	2.1	0.052		1412	2.0	0.053	
11:00	1204	1.7	0.060		1468	2.1	0.050		1474	2.1	0.051		1423	2.0	0.053	
12:00	1488	2.1	0.060	0.168	1873	2.7	0.050	0.101	1833	2.6	0.051	0.129	1815	2.6	0.052	0.133
13:00	1473	2.1	0.060		1864	2.7	0.050		1827	2.6	0.051		1812	2.6	0.052	
14:00	1499	2.1	0.061		1591	2.3	0.051		1777	2.5	0.052		1759	2.5	0.052	
15:00	1507	2.2	0.063	0.120	1614	2.3	0.052	0.080	1785	2.6	0.053	0.079	1760	2.5	0.054	0.098
16:00	1417	2.0	0.061		1625	2.3	0.052		1811	2.6	0.054		1765	2.5	0.054	
17:00	1459	2.1	0.062		1614	2.3	0.053		1797	2.6	0.054		1776	2.5	0.055	
18:00	1539	2.2	0.063	0.083	1724	2.5	0.053	0.096	1926	2.8	0.054	0.079	1876	2.7	0.055	0.078
19:00	1575	2.3	0.063		1746	2.5	0.053		1980	2.8	0.055		1951	2.8	0.056	
20:00	1824	2.6	0.065		1919	2.7	0.056		2199	3.1	0.058		2007	2.9	0.059	
21:00	1953	2.8	0.069	0.089	2190	3.1	0.059	0.090	2158	3.1	0.061	0.089	2276	3.3	0.061	0.098
22:00	1859	2.7	0.070		2095	3.0	0.061		2265	3.2	0.063		2166	3.1	0.063	
23:00	1854	2.6	0.071		2116	3.0	0.061		2241	3.2	0.064		2176	3.1	0.064	
# of SAMPLES	24	24	24	8	24	24	24	8	24	24	24	8	24	24	24	8
MAXIMUM	1953	2.8	0.071	0.168	2190	3.1	0.063	0.136	2265	3.2	0.064	0.129	2276	3.3	0.064	0.134
MINIMUM	1201	1.7	0.060	0.074	1468	2.1	0.050	0.082	1434	2.0	0.051	0.074	1412	2.0	0.052	0.071
AVERAGE	1423	2.0	0.063	0.098	1664	2.4	0.054	0.096	1734	2.5	0.055	0.091	1686	2.4	0.055	0.091

INDIVIDUAL FILTER DATA

(9/10/09)

TIME	FILTER # 11				FILTER # 12				COMBINED FILTER EFFLUENT # 1 (filters #7,9,&11)				COMBINED FILTER EFFLUENT # 2 (filters #8,10,&12)			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1156	1.7	0.058	0.087	1601	2.3	0.055	0.091								
1:00	1172	1.7	0.058		1661	2.4	0.055									
2:00	1103	1.6	0.057		1540	2.2	0.054									
3:00	1094	1.6	0.057	0.077	1539	2.2	0.054	0.094								
4:00	1092	1.6	0.056		1521	2.2	0.054									
5:00	1091	1.6	0.056		1514	2.2	0.053									
6:00	1095	1.6	0.055	0.074	1519	2.2	0.053	0.086								
7:00	1096	1.6	0.055		1524	2.2	0.053									
8:00	1094	1.6	0.055		1503	2.1	0.052									
9:00	1095	1.6	0.055	0.105	1510	2.2	0.052	0.105								
10:00	1092	1.6	0.054		1519	2.2	0.051									
11:00	1040	1.5	0.054		1478	2.1	0.051									
12:00	1448	2.1	0.054	0.105												
13:00	1431	2.0	0.054						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
14:00	1353	1.9	0.055						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
15:00	1342	1.9	0.055	0.079					N.R.	N/A	N.R.	0.108	N.R.	N/A	N.R.	0.087
16:00	1373	2.0	0.055						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
17:00	1364	1.9	0.056						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
18:00	1434	2.0	0.056	0.084					N.R.	N/A	N.R.	0.083	N.R.	N/A	N.R.	0.087
19:00	1462	2.1	0.057						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
20:00	1549	2.2	0.059						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
21:00	1650	2.4	0.062	0.090					N.R.	N/A	N.R.	0.091	N.R.	N/A	N.R.	0.102
22:00	1584	2.3	0.063						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
23:00	1593	2.3	0.064						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
# of SAMPLES	24	24	24	8	12	12	12	4	N/A	N/A	N/A	3	N/A	N/A	N/A	3
MAXIMUM	1650	2.4	0.064	0.105	1661	2.4	0.055	0.105	N/A	N/A	N/A	0.108	N/A	N/A	N/A	0.102
MINIMUM	1040	1.5	0.054	0.074	1478	2.1	0.051	0.086	N/A	N/A	N/A	0.083	N/A	N/A	N/A	0.087
AVERAGE	1283	1.8	0.057	0.088	1536	2.2	0.053	0.094	N/A	N/A	N/A	0.094	N/A	N/A	N/A	0.092

*Only applicable if water is distributed to residents, due to placement of sample tap.

*Only applicable if water is distributed to residents, due to placement of sample tap.

TAKEN OUT OF SERVICE.
Due to a positive coliform sample (1 MPN), just prior to distributing water to residents

N.R. =Not recorded N/A = Not applicable

INDIVIDUAL FILTER DATA

(9/11/09)

TIME	FILTER # 7				FILTER # 8				FILTER # 9				FILTER # 10			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1801	2.6	0.072	0.082	2060	2.9	0.062	0.091	2193	3.1	0.065	0.094	2165	3.1	0.065	0.086
1:00	1772	2.5	0.073		1998	2.9	0.062		2145	3.1	0.065		2086	3.0	0.065	
2:00	1749	2.5	0.072		2002	2.9	0.062		2134	3.0	0.064		2060	2.9	0.064	
3:00	1748	2.5	0.072	0.079	2018	2.9	0.061	0.085	2111	3.0	0.064	0.081	2088	3.0	0.064	0.086
4:00	1547	2.2	0.069		1790	2.6	0.058		1898	2.7	0.061		1869	2.7	0.062	
5:00	1589	2.2	0.068		1803	2.6	0.058		1911	2.7	0.061		1856	2.7	0.061	
6:00	1442	2.1	0.064	0.110	1683	2.4	0.054	0.120	1705	2.4	0.057	0.149	1679	2.4	0.057	0.150
7:00	1454	2.1	0.063		1682	2.4	0.053		1761	2.5	0.054		1662	2.4	0.055	
8:00	1442	2.1	0.061		1677	2.4	0.052		1776	2.5	0.053		1671	2.4	0.055	
9:00	2420	3.5	0.059	0.082	2809	4.0	0.052	0.080	2768	4.0	0.053	0.083	2660	3.8	0.053	0.075
10:00	1484	2.1	0.060		2045	2.9	0.050		1788	2.6	0.051		1956	2.8	0.052	
11:00	1907	2.7	0.056		2175	3.1	0.047		2255	3.2	0.048		2090	3.0	0.049	
12:00	1654	2.4	0.057	0.072	1911	2.7	0.048	0.077	1970	2.8	0.048	0.082	1975	2.8	0.050	0.088
13:00	1629	2.3	0.057		1904	2.7	0.047		1969	2.8	0.049		1962	2.8	0.050	
14:00	1660	2.4	0.062		1904	2.7	0.052		1976	2.8	0.054		1873	2.7	0.055	
15:00	1720	2.5	0.064	0.112	2004	2.9	0.055	0.090	2066	3.0	0.056	0.121	1929	2.8	0.057	0.149
16:00	1662	2.4	0.070		1961	2.8	0.061		2011	2.9	0.062		1867	2.7	0.063	
17:00	1651	2.4	0.070		1968	2.8	0.061		1983	2.8	0.062		1878	2.7	0.063	
18:00	1642	2.3	0.070	0.149	1926	2.8	0.061	0.132	1974	2.8	0.062	0.136	1870	2.7	0.063	0.138
19:00	1638	2.3	0.072		1954	2.8	0.062		1957	2.8	0.063		1856	2.7	0.064	
20:00	1635	2.3	0.072		1928	2.8	0.063		1985	2.8	0.064		1868	2.7	0.065	
21:00	1625	2.3	0.075	0.141	1956	2.8	0.065	0.134	1959	2.8	0.066	0.131	1859	2.7	0.068	0.163
22:00	1622	2.3	0.076		1922	2.7	0.065		1974	2.8	0.067		1856	2.7	0.068	
23:00	1616	2.3	0.075		1937	2.8	0.065		1956	2.8	0.067		1875	2.7	0.068	
# of SAMPLES	24	24	24	8	24	24	24	8	24	24	24	8	24	24	24	8
MAXIMUM	2420	3.5	0.076	0.149	2809	4.0	0.065	0.134	2768	4.0	0.067	0.149	2660	3.8	0.068	0.163
MINIMUM	1442	2.1	0.056	0.072	1677	2.4	0.047	0.077	1705	2.4	0.048	0.081	1662	2.4	0.049	0.075
AVERAGE	1669	2.4	0.067	0.103	1959	2.8	0.057	0.103	2009	2.9	0.059	0.110	1938	2.8	0.060	0.117

INDIVIDUAL FILTER DATA

(9/11/09)

TIME	FILTER # 11				FILTER # 12				COMBINED FILTER EFFLUENT # 1 (filters #7,9,&11)				COMBINED FILTER EFFLUENT # 2 (filters #8,10,&12)			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1551	2.2	0.066	0.093	TAKEN OUT OF SERVICE. Due to a positive coliform sample (1 MPN), just prior to distributing water to residents. Put back in service after consecutive clear samples.				N.R.	N/A	N.R.	0.090	N.R.	N/A	N.R.	0.097
1:00	1536	2.2	0.067						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
2:00	1522	2.2	0.067						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
3:00	1530	2.2	0.066	0.084					N.R.	N/A	N.R.	0.080	N.R.	N/A	N.R.	0.083
4:00	1375	2.0	0.063						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
5:00	1395	2.0	0.062						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
6:00	1163	1.7	0.059	0.085					N.R.	N/A	N.R.	0.135	N.R.	N/A	N.R.	0.132
7:00	1264	1.8	0.057						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
8:00	1273	1.8	0.056						N.R.	N/A	N.R.		N.R.	N/A	N.R.	
9:00	1956	2.8	0.059	0.082					N.R.	N/A	N.R.	0.129	N.R.	N/A	N.R.	0.079
10:00	1919	2.7	0.055		2010	2.9	0.090		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
11:00	1725	2.5	0.051		2233	3.2	0.053		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
12:00	1454	2.1	0.051	0.078	1924	2.7	0.052	0.080	N.R.	N/A	N.R.	0.074	N.R.	N/A	N.R.	0.072
13:00	1439	2.1	0.051		1921	2.7	0.052		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
14:00	1455	2.1	0.056		1931	2.8	0.057		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
15:00	1550	2.2	0.058	0.157	2056	2.9	0.060	0.150	N.R.	N/A	N.R.	0.113	N.R.	N/A	N.R.	0.135
16:00	1524	2.2	0.065		2015	2.9	0.068		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
17:00	1509	2.2	0.065		2020	2.9	0.068		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
18:00	1513	2.2	0.065	0.161	1996	2.9	0.069	0.166	N.R.	N/A	N.R.	0.127	N.R.	N/A	N.R.	0.133
19:00	1492	2.1	0.066		2056	2.9	0.070		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
20:00	1554	2.2	0.067		1994	2.8	0.070		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
21:00	1504	2.1	0.070	0.128	2012	2.9	0.074	0.132	N.R.	N/A	N.R.	0.135	N.R.	N/A	N.R.	0.136
22:00	1519	2.2	0.070		2020	2.9	0.074		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
23:00	1514	2.2	0.071		2006	2.9	0.074		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
# of SAMPLES	24	24	24	8	14	14	14	4	N/A	N/A	N/A	8	N/A	N/A	N/A	8
MAXIMUM	1956	2.8	0.071	0.161	2233	3.2	0.090	0.166	N/A	N/A	N/A	0.135	N/A	N/A	N/A	0.198
MINIMUM	1163	1.7	0.051	0.078	1921	2.7	0.052	0.080	N/A	N/A	N/A	0.074	N/A	N/A	N/A	0.072
AVERAGE	1510	2.2	0.062	0.109	2014	2.9	0.067	0.132	N/A	N/A	N/A	0.110	N/A	N/A	N/A	0.108

N.R. =Not recorded N/A = Not applicable

INDIVIDUAL FILTER DATA

(9/12/09)

TIME	FILTER # 7				FILTER # 8				FILTER # 9				FILTER # 10			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1636	2.3	0.075	0.087	1950	2.8	0.064	0.099	1963	2.8	0.066	0.091	1871	2.7	0.067	0.117
1:00	1626	2.3	0.075		1942	2.8	0.065		1998	2.9	0.066		1862	2.7	0.067	
2:00	1619	2.3	0.074		1924	2.7	0.064		1966	2.8	0.066		1869	2.7	0.066	
3:00	1651	2.4	0.074	0.085	1973	2.8	0.064	0.110	2004	2.9	0.065	0.101	1898	2.7	0.066	0.089
4:00	1661	2.4	0.074		1986	2.8	0.063		1992	2.8	0.065		1908	2.7	0.066	
5:00	1654	2.4	0.074		1992	2.8	0.063		1998	2.9	0.065		1994	2.8	0.066	
6:00	1648	2.4	0.071	0.142	1984	2.8	0.060	0.142	1999	2.9	0.061	0.156	1887	2.7	0.063	0.123
7:00	1621	2.3	0.068		1940	2.8	0.057		1955	2.8	0.058		1875	2.7	0.060	
8:00	1604	2.3	0.066		1951	2.8	0.055		1909	2.7	0.057		1829	2.6	0.058	
9:00	1566	2.2	0.065	0.082	1865	2.7	0.053	0.086	1891	2.7	0.054	0.081	1805	2.6	0.055	0.095
10:00	1526	2.2	0.062		1853	2.6	0.050		1853	2.6	0.052		1784	2.5	0.053	
11:00	1509	2.2	0.059		1839	2.6	0.049		1801	2.6	0.050		1775	2.5	0.051	
12:00	1529	2.2	0.060	0.079	1840	2.6	0.048	0.076	1825	2.6	0.049	0.074	1781	2.5	0.050	0.078
13:00	1513	2.2	0.060		1842	2.6	0.048		1814	2.6	0.048		1773	2.5	0.050	
14:00	1502	2.1	0.058		1860	2.7	0.046		1839	2.6	0.046		1796	2.6	0.048	
15:00	1514	2.2	0.058	0.161	1839	2.6	0.045	0.169	1809	2.6	0.046	0.131	1765	2.5	0.048	0.117
16:00	1485	2.1	0.057		1802	2.6	0.046		1798	2.6	0.046		1758	2.5	0.048	
17:00	1492	2.1	0.057		1807	2.6	0.046		1805	2.6	0.047		1733	2.5	0.048	
18:00	1476	2.1	0.057	0.118	1811	2.6	0.045	0.161	1794	2.6	0.045	0.140	1749	2.5	0.047	0.114
19:00	1469	2.1	0.057		1797	2.6	0.045		1807	2.6	0.045		1445	2.1	0.048	
20:00	1464	2.1	0.056		1781	2.5	0.045		1756	2.5	0.048		1640	2.3	0.048	
21:00	1460	2.1	0.056	0.144	1811	2.6	0.045	0.166	1792	2.6	0.046	0.166	1746	2.5	0.048	0.110
22:00	N.R.	N/A	N.R.		N.R.	N/A	N.R.		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
23:00	1506	2.2	0.056		1834	2.6	0.045		1813	2.6	0.046		1752	2.5	0.048	
# of SAMPLES	23	23	23	8	23	23	23	8	23	23	23	8	23	23	23	8
MAXIMUM	1661	2.4	0.075	0.161	1992	2.8	0.065	0.169	2004	2.9	0.066	0.166	1994	2.8	0.067	0.214
MINIMUM	1460	2.1	0.056	0.079	1781	2.5	0.045	0.076	1756	2.5	0.045	0.074	1445	2.1	0.047	0.078
AVERAGE	1554	2.2	0.064	0.112	1879	2.7	0.053	0.126	1877	2.7	0.054	0.120	1795	2.6	0.055	0.105

N.R. =Not recorded N/A = Not applicable

INDIVIDUAL FILTER DATA

(9/12/09)

TIME	FILTER # 11				FILTER # 12				COMBINED FILTER EFFLUENT # 1 (filters #7,9,&11)				COMBINED FILTER EFFLUENT # 2 (filters #8,10,&12)			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1511	2.2	0.070	0.099	1996	2.9	0.073	0.100	N.R.	N/A	N.R.	0.090	N.R.	N/A	N.R.	0.094
1:00	1519	2.2	0.070		2001	2.9	0.073		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
2:00	1511	2.2	0.069		2006	2.9	0.072		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
3:00	1539	2.2	0.069	0.098	2048	2.9	0.072	0.101	N.R.	N/A	N.R.	0.103	N.R.	N/A	N.R.	0.089
4:00	1537	2.2	0.069		2052	2.9	0.072		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
5:00	1544	2.2	0.068		2046	2.9	0.071		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
6:00	1537	2.2	0.065	0.097	2031	2.9	0.067	0.094	N.R.	N/A	N.R.	0.091	N.R.	N/A	N.R.	0.099
7:00	1527	2.2	0.062		1999	2.9	0.064		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
8:00	1499	2.1	0.060		1999	2.9	0.061		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
9:00	1472	2.1	0.057	0.097	1944	2.8	0.059	0.091	N.R.	N/A	N.R.	0.072	N.R.	N/A	N.R.	0.078
10:00	1450	2.1	0.055		1916	2.7	0.057		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
11:00	1444	2.1	0.053		1896	2.7	0.055		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
12:00	1455	2.1	0.052	0.083	1915	2.7	0.053	0.084	N.R.	N/A	N.R.	0.085	N.R.	N/A	N.R.	0.088
13:00	1439	2.1	0.051		1914	2.7	0.051		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
14:00	1454	2.1	0.050		1925	2.8	0.051		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
15:00	1446	2.1	0.049	0.112	1899	2.7	0.050	0.088	N.R.	N/A	N.R.	0.106	N.R.	N/A	N.R.	0.097
16:00	1431	2.0	0.049		1896	2.7	0.050		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
17:00	1436	2.1	0.050		1899	2.7	0.050		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
18:00	1441	2.1	0.049	0.087	1881	2.7	0.049	0.174	N.R.	N/A	N.R.	0.147	N.R.	N/A	N.R.	0.131
19:00	1433	2.0	0.049		1892	2.7	0.049		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
20:00	1436	2.1	0.049		1801	2.6	0.050		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
21:00	1428	2.0	0.049	0.105	1875	2.7	0.050	0.139	N.R.	N/A	N.R.	0.124	N.R.	N/A	N.R.	0.112
22:00	N.R.	N/A	N.R.		N.R.	N/A	N.R.		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
23:00	1459	2.1	0.049		1922	2.7	0.050		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
# of SAMPLES	23	23	23	8	23	23	23	8	N/A	N/A	N/A	8	N/A	N/A	N/A	8
MAXIMUM	1544	2.2	0.070	0.112	2052	2.9	0.073	0.174	N/A	N/A	N/A	0.147	N/A	N/A	N/A	0.131
MINIMUM	1428	2.0	0.049	0.083	1801	2.6	0.049	0.084	N/A	N/A	N/A	0.072	N/A	N/A	N/A	0.078
AVERAGE	1476	2.1	0.057	0.097	1946	2.8	0.059	0.109	N/A	N/A	N/A	0.102	N/A	N/A	N/A	0.099

N.R. =Not recorded N/A = Not applicable

INDIVIDUAL FILTER DATA

(9/13/09)

TIME	FILTER # 7				FILTER # 8				FILTER # 9				FILTER # 10			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1326	1.9	0.059	0.064	1656	2.4	0.045	0.073	1600	2.3	0.047	0.082	1596	2.3	0.049	0.077
1:00	1197	1.7	0.062		1510	2.2	0.044		1468	2.1	0.048		1460	2	0.049	
2:00	1001	1.4	0.063		1228	1.8	0.044		1182	1.7	0.046		1241	1.8	0.050	
3:00	991	1.4	0.060	0.065	1237	1.8	0.043	0.065	1179	1.7	0.044	0.065	1232	1.8	0.046	0.073
4:00	996	1.4	0.073		1259	1.8	0.042		1196	1.7	0.044		1254	1.8	0.046	
5:00	1009	1.4	0.077		1252	1.8	0.041		1193	1.7	0.043		1255	1.8	0.044	
6:00	1112	1.6	0.071		1393	2.0	0.040		1335	1.9	0.042		1379	2.0	0.044	
7:00	1493	2.1	0.051		1886	2.7	0.034		1815	2.6	0.036		1789	2.6	0.038	
8:00	1486	2.1	0.048		1805	2.6	0.032		1796	2.6	0.033		1777	2.5	0.036	
9:00				0.078				0.068				0.149				0.130
10:00																
11:00																
12:00																
# of SAMPLES	9	9	9	3	9	9	9	3	9	9	9	3	9	9	9	3
MAXIMUM	1493	2.1	0.077	0.078	1886	2.7	0.045	0.073	1815	2.6	0.048	0.149	1789	2.6	0.050	0.130
MINIMUM	991	1.4	0.048	0.064	1228	1.8	0.032	0.065	1179	1.7	0.033	0.065	1232	1.8	0.036	0.073
AVERAGE	1179	1.7	0.064	0.069	1470	2.1	0.041	0.069	1418	2.0	0.043	0.099	1443	2	0.045	0.093

INDIVIDUAL FILTER DATA

(9/13/09)

TIME	FILTER # 11				FILTER # 12				COMBINED FILTER EFFLUENT # 1 (filters #7,9,&11)				COMBINED FILTER EFFLUENT # 2 (filters #8,10,&12)			
	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)	FLOW (GPM)	FILTRATION RATE (GPM/sq.ft)	INLINE TURBIDITY (NTU)	LAB TURBIDITY (NTU)
0:00	1316	1.9	0.049	0.070	1722	2.5	0.054	0.068	N.R.	N/A	N.R.	0.078	N.R.	N/A	N.R.	0.087
1:00	1218	1.7	0.050		1601	2.3	0.053		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
2:00	920	1.3	0.049		1216	1.7	0.056		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
3:00	936	1.3	0.047	0.093	1229	1.8	0.055	0.060	N.R.	N/A	N.R.	0.084	N.R.	N/A	N.R.	0.079
4:00	932	1.3	0.046		1241	1.8	0.056		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
5:00	934	1.3	0.046		1245	1.8	0.056		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
6:00	1026	1.5	0.046		1352	1.9	0.056		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
7:00	1483	2.1	0.040		1921	2.7	0.042		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
8:00	1466	2.1	0.036		1916	2.7	0.036		N.R.	N/A	N.R.		N.R.	N/A	N.R.	
9:00				0.060				0.073	N.R.	N/A	N.R.	0.119	N.R.	N/A	N.R.	0.076
10:00									N.R.	N/A	N.R.		N.R.	N/A	N.R.	
11:00									N.R.	N/A	N.R.		N.R.	N/A	N.R.	
12:00									N.R.	N/A	N.R.		N.R.	N/A	N.R.	
# of SAMPLES	9	9	9	3	9	9	9	3	N/A	N/A	N/A	3	N/A	N/A	N/A	3
MAXIMUM	1483	2.1	0.050	0.093	1921	2.7	0.056	0.060	N/A	N/A	N/A	0.119	N/A	N/A	N/A	0.087
MINIMUM	920	1.3	0.036	0.060	1216	1.7	0.036	0.068	N/A	N/A	N/A	0.078	N/A	N/A	N/A	0.076
AVERAGE	1137	1.6	0.045	0.074	1494	2.1	0.052	0.074	N/A	N/A	N/A	0.094	N/A	N/A	N/A	0.081

N.R. =Not recorded N/A = Not applicable

BAD TURB needs to be replaced

BAD TURB

MICROBIOLOGICAL DATA

DATE	TIME	SOURCE WATER (River Intake)			POST OZONE			PLATE SETTELER EFFLUENT		
		TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC
9/8/2009	12:00	1374.0	30.0	1080.0	461.1	1.0	287.0	3.0	< 1	40.0
	15:00	1722.0	20.0	570.0	224.7	< 1	372.0	< 1	< 1	10.0
	18:00	1664.0	62.0		143.9	< 1		< 1	< 1	
	21:00	2247.0	41.0		145.0	< 1		< 1	< 1	
9/9/2009	0:00	2014.0	134.0		105.0	< 1		< 1	< 1	
	3:00	1935.0	74.0		96.0	< 1		< 1	< 1	
	6:00	2187.0	110.0	1610.0	104.6	1.0	311.0	< 1	< 1	6.0
	9:00	3076.0	160.0		81.3	< 1		< 1	< 1	
	12:00	2613.0	146.0	2870.0	90.8	< 1	>738	< 1	< 1	6.0
	15:00	2143.0	189.0		248.9	2.0		< 1	< 1	
	18:00	1989.0	74.0	1460.0	275.5	< 1	372.0	< 1	< 1	2.0
	21:00	1866.0	109.0		156.9	< 1		< 1	< 1	
9/10/2009	0:00	2282.0	110.0	2760.0	248.1	2.0	311.0	< 1	< 1	40.0
	3:00	2481.0	97.0		275.5	4.1		< 1	< 1	
	6:00	2247.0	75.0		488.4	2.0		< 1	< 1	
	9:00	2282.0	41.0	2870.0	204.6	< 1	>738	< 1	< 1	6.0
	12:00	2359.0	98.0		547.5	5.2		< 1	< 1	
	15:00	2247.0	84.0		517.2	13.3		< 1	< 1	
	18:00	2700.0	41.0	2160.0	1986.3	25.9	440.0	< 1	< 1	17.0
	21:00	2282.0	122.0		517.2	4.1		< 1	< 1	
9/11/2009	0:00	1500.0	< 1		387.3	6.3		< 1	< 1	
	3:00	1539.0	63.0	1660.0	1732.9	7.5	97.0	< 1	< 1	17.0
	6:00	1187.0	20.0		261.3	4.1		< 1	< 1	
	9:00	1624.0	52.0		616.4	3.1		< 1	< 1	
	12:00	2909.0	74.0	1830.0	770.1	1.0	440.0	< 1	< 1	59.0
	15:00	1723.0	41.0	1160.0	1205.3	3.0	>738	< 1	< 1	57.0
	18:00	1333.0	52.0		920.8	5.2		< 1	< 1	
	21:00	2613.0	53.0		770.1	4.1		44.8	< 1	
9/12/2009	0:00	1553.0	86.0	3240.0	365.4	1.0	>738	< 1	< 1	62.0
	3:00	774.0	20.0		260.3	1.0		< 1	< 1	
	6:00	1314.0	75.0		204.6	1.0		1.0	< 1	
	9:00	Present	Present		Present	Absent		Absent	Absent	
	12:00	959.0	10.0	1160.0	307.6	< 1	>738	< 1	< 1	17.0
	15:00	Present	Present	1370.0	Present	Absent	470.0	Absent	Absent	2.0
	18:00	N/A	N/A		686.7	< 1		< 1	< 1	
	21:00	Present	Present		Present	Absent		Present	Absent	
9/13/2009	0:00	272.0	< 1		261.3	< 1		< 1	< 1	
	3:00	464.0	10.0		179.3	1.0		< 1	< 1	
	9:00	1860.0	< 1	2990.0	272.3	< 1	738.0	> 2419.6	< 1	623.0

# of SAMPLES	38	38	15	39	39	15	39	39	15	
MAXIMUM	3076.0	189.0	3240.0	1986.3	25.9	>738	44.8	< 1	623.0	
MINIMUM	272.0	< 1	970.0	81.3	< 1	287.0	< 1	< 1	2.0	

MICROBIOLOGICAL DATA

DATE	TIME	CONTACT CLAIRIFIER EFFLUENT (Filter Influent)			FILTER # 7			FILTER # 8			FILTER # 9		
		TOTAL COLIFORMS	FECAL COLIFORMS/E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC
9/8/2009	12:00	18.7	< 1	299.0									
	15:00	2.0	< 1	4.0									
	18:00	< 1	< 1										
	21:00	< 1	< 1								< 1	< 1	
9/9/2009	0:00	< 1	< 1					< 1	< 1		< 1	< 1	
	3:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	6:00	< 1	< 1	56.0	< 1	< 1	71	< 1	< 1	59	< 1	< 1	30
	9:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	12:00	< 1	< 1	86.0	< 1	< 1	124	< 1	< 1	195	< 1	< 1	43
	15:00	1.0	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	18:00	< 1	< 1	6.0	< 1	< 1	195	< 1	< 1	299	< 1	< 1	62
	21:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
9/10/2009	0:00	< 1	< 1	26.0	< 1	< 1	48	< 1	< 1	128	< 1	< 1	33
	3:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	6:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	9:00	< 1	< 1	4.0	< 1	< 1	71	< 1	< 1	106	< 1	< 1	45
	12:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	15:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	18:00	< 1	< 1	<2	< 1	< 1	<2	< 1	< 1	6	< 1	< 1	<2
	21:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
9/11/2009	0:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	3:00	< 1	< 1	239.0	< 1	< 1	12	< 1	< 1	33	< 1	< 1	23
	6:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	9:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	12:00	< 1	< 1	311.0	< 1	< 1	26	< 1	< 1	56	< 1	< 1	19
	15:00	< 1	< 1	161.0	< 1	< 1	26	< 1	< 1	48	< 1	< 1	19
	18:00	< 1	< 1		3.1	< 1		3.1	< 1		2	< 1	
	21:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
9/12/2009	0:00	< 1	< 1	216.0	< 1	< 1	21	< 1	< 1	23	< 1	< 1	21
	3:00	< 1	< 1		< 1	< 1		< 1	< 1		< 1	< 1	
	6:00	< 1	< 1		2	< 1		3.1	< 1		2	< 1	
	9:00	Absent	Absent		Present	Absent		Present	Absent		Present	Absent	
	12:00	< 1	< 1	74.0	5.2	< 1	171	8.5	< 1	195	9.8	< 1	59
	15:00	Absent	Absent	15.0	Present	Absent	104	Present	Absent	100	Present	Absent	53
	18:00	< 1	< 1		21.3	< 1		26.2	< 1		17.5	< 1	
	21:00	Absent	Absent		Present	Absent		Present	Absent		Present	Absent	
9/13/2009	0:00	< 1	< 1		38.4	< 1		32.7	< 1		47.1	< 1	
	3:00	< 1	< 1		Present	Absent		Present	Absent		Present	Absent	
	9:00	> 2419.6	1.0	339.0	> 2419.6	< 1	68	> 2419.6	< 1	216	> 2419.6	< 1	120
# of SAMPLES		39	39	15	34	34	13	35	35	13	36	36	13
MAXIMUM		> 2419.6	1.0	339.0	> 2419.6	< 1	195.0	> 2419.6	< 1	299.0	> 2419.6	< 1	120.0
MINIMUM		< 1	< 1	< 2	1.0	< 1	12.0	< 1	< 1	6.0	< 1	< 1	19.0

MICROBIOLOGICAL DATA

DATE	TIME	FILTER # 10			FILTER # 11			FILTER # 12		
		TOTAL COLIFORMS	FECAL COLIFORMS/E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/ E.Coli	HPC
9/8/2009	12:00									
	15:00									
	18:00									
	21:00							< 1	< 1	
9/9/2009	0:00							< 1	< 1	
	3:00	< 1	< 1		< 1	< 1		< 1	< 1	
	6:00	< 1	< 1	48	< 1	< 1	53.0	< 1	< 1	23.0
	9:00	< 1	< 1		< 1	< 1		1.0	< 1	
	12:00	< 1	< 1	51	< 1	< 1	166.0	1.0	< 1	26.0
	15:00	< 1	< 1		1.0	< 1		< 1	< 1	
	18:00	< 1	< 1	51	< 1	< 1	120.0	< 1	< 1	56.0
	21:00	< 1	< 1		< 1	< 1		< 1	< 1	
9/10/2009	0:00	< 1	< 1	23	< 1	< 1	51.0	< 1	< 1	8.0
	3:00	< 1	< 1		< 1	< 1		< 1	< 1	
	6:00	< 1	< 1		< 1	< 1		< 1	< 1	
	9:00	< 1	< 1	26	< 1	< 1	55.0	< 1	< 1	15.0
	12:00	< 1	< 1		< 1	< 1				
	15:00	< 1	< 1		< 1	< 1				
	18:00	< 1	< 1	4	< 1	< 1	4.0			
	21:00	< 1	< 1		< 1	< 1		Out of service		
9/11/2009	0:00	< 1	< 1		< 1	< 1				
	3:00	< 1	< 1	19	< 1	< 1	8.0			
	6:00	< 1	< 1		< 1	< 1				
	9:00	< 1	< 1		< 1	< 1				
	12:00	< 1	< 1	56	< 1	< 1	26.0	1.0	< 1	137.0
	15:00	1	< 1	62	1.0	< 1	38.0	3.1	< 1	77.0
	18:00	< 1	< 1		3.1	< 1		2.0	< 1	
	21:00	< 1	< 1		< 1	< 1		< 1	< 1	
9/12/2009	0:00	< 1	< 1	90	< 1	< 1	19.0	< 1	< 1	339.0
	3:00	< 1	< 1		< 1	< 1		< 1	< 1	
	6:00	1	< 1		3.1	< 1		1.0	< 1	
	9:00	Present	Absent		Present	Absent		Present	Absent	
	12:00	6.2	< 1	392	4.1	< 1	141.0	5.1	< 1	>738
	15:00	Present	Absent	128	Present	Absent	177.0	Present	Absent	>738
	18:00	24.1	< 1		19.9	< 1		17.3	< 1	
	21:00	Present	Absent		Present	Absent		Present	Absent	
9/13/2009	0:00	36.9	< 1		35.9	< 1		62.4	< 1	
	3:00	Present	Absent		Present	Absent		Present	Absent	
	9:00	> 2419.6	< 1	183	1986.3	< 1	116.0	> 2419.6	< 1	151.0

# of SAMPLES	34	34	13	34	34	13	28	28	11
MAXIMUM	> 2419.6	< 1	392.0	1986.3	< 1	177.0	2419.6	< 1	> 738
MINIMUM	< 1	< 1	4.0	< 1	< 1	4.0	< 1	< 1	8.0

MICROBIOLOGICAL DATA

DATE	TIME	COMBINED FILTER EFFLUENT # 1 (filters #7,9,&11)			COMBINED FILTER EFFLUENT # 2 (filters #8,10,&12)		
		TOTAL COLIFORMS	FECAL COLIFORMS/E.Coli	HPC	TOTAL COLIFORMS	FECAL COLIFORMS/E.Coli	HPC
9/8/2009	12:00						
	15:00						
	18:00						
	21:00						
9/9/2009	0:00						
	3:00						
	6:00						
	9:00	*Only applicable if water is distributed to residents, due to placement of sample tap.			*Only applicable if water is distributed to residents, due to placement of sample tap.		
	12:00						
	15:00						
	18:00						
	21:00						
9/10/2009	0:00						
	3:00						
	6:00						
	9:00						
	12:00						
	15:00	< 1	< 1		< 1	< 1	
	18:00	< 1	< 1	<2	< 1	< 1	<2
	21:00	< 1	< 1		< 1	< 1	
9/11/2009	0:00	< 1	< 1		< 1	< 1	
	3:00	< 1	< 1	8.0	< 1	< 1	23.0
	6:00	< 1	< 1		< 1	< 1	
	9:00	< 1	< 1		< 1	< 1	
	12:00	< 1	< 1	21.0	< 1	< 1	77.0
	15:00	1.0	< 1	48.0	2.0	< 1	65.0
	18:00	4.1	< 1		3.1	< 1	
	21:00	< 1	< 1		< 1	< 1	
9/12/2009	0:00	< 1	< 1	19.0	< 1	< 1	195.0
	3:00	< 1	< 1		< 1	< 1	
	6:00	2.0	< 1		2.0	< 1	
	9:00	Present	Absent		Present	Absent	
	12:00	12.1	< 1	146.0	4.1	< 1	>738
	15:00	Present	Absent	156.0	Present	Absent	>738
	18:00	14.5	< 1		8.5	< 1	
	21:00	Present	Absent		Present	Absent	
9/13/2009	0:00	35.9	< 1		36.9	< 1	
	3:00	Present	Absent		Present	Absent	
	9:00	> 2419.6	< 1	183.0	> 2419.6	< 1	223.0

# of SAMPLES	22	22	8	22	22	8
MAXIMUM	> 2419.6	< 1	183.0	> 2419.6	< 1	> 738
MINIMUM	< 1	< 1	< 2	< 1	< 1	< 2

POST CHLORINATION & MICROBIOLOGICAL DATA

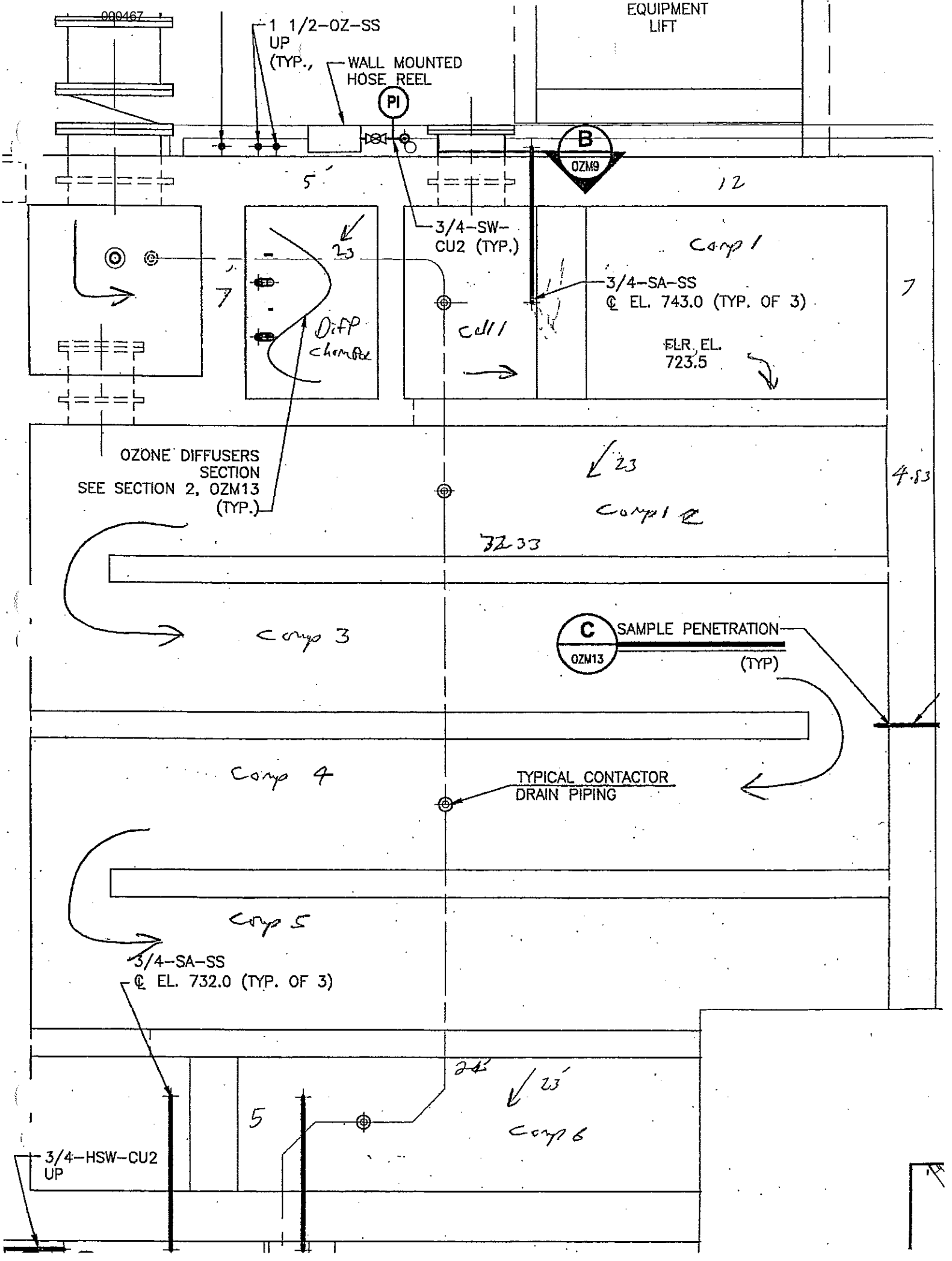
DATE	TIME	PS4 (Post chlorination well)			PS4 Chlorine		
		TOTAL COLIFORMS	FECAL COLIFORMS/E.Coli	HPC	Dosage	Free Residual mg/L	Total Residual mg/L
9/8/2009	12:00	*Only applicable when water is distributed to residents.			*Only applicable when water is distributed to residents.		
	15:00						
	18:00						
	21:00						
9/9/2009	0:00						
	3:00						
	6:00						
	9:00						
	12:00						
	15:00						
	18:00						
	21:00						
9/10/2009	0:00						
	3:00						
	6:00						
	9:00						
	12:00						
	15:00						
	18:00						
	21:00						
9/11/2009	0:00						
	3:00						
	6:00						
	9:00				2.3	1.2	1.4
	12:00	< 1	< 1	<2	2.3	1.5	1.7
	15:00	< 1	< 1	<2	2.0	1.3	1.6
	18:00	< 1	< 1		2.0	1.0	1.2
	21:00	< 1	< 1		2.0	0.6	0.8
9/12/2009	0:00	< 1	< 1	<2	2.0	0.4	0.7
	3:00	< 1	< 1		1.9	0.9	1.1
	6:00	< 1	< 1		2.0	1.4	1.7
	9:00	Absent	Absent		1.8	1.3	1.7
	12:00	< 1	< 1	<2	1.8	1.3	1.7
	15:00	Absent	Absent	<2	1.9	1.3	1.6
	18:00	< 1	< 1		2.7	1.2	1.6
	21:00	Absent	Absent		1.9	1.2	1.7
9/13/2009	0:00	< 1	< 1		2.6	1.3	1.7
	3:00	Absent	Absent		2.6	1.2	1.6
	9:00	< 1	< 1	<2	1.9	2.6	3.0

# of SAMPLES	15	15	6
MAXIMUM	< 1	< 1	<2
MINIMUM	< 1	< 1	< 2

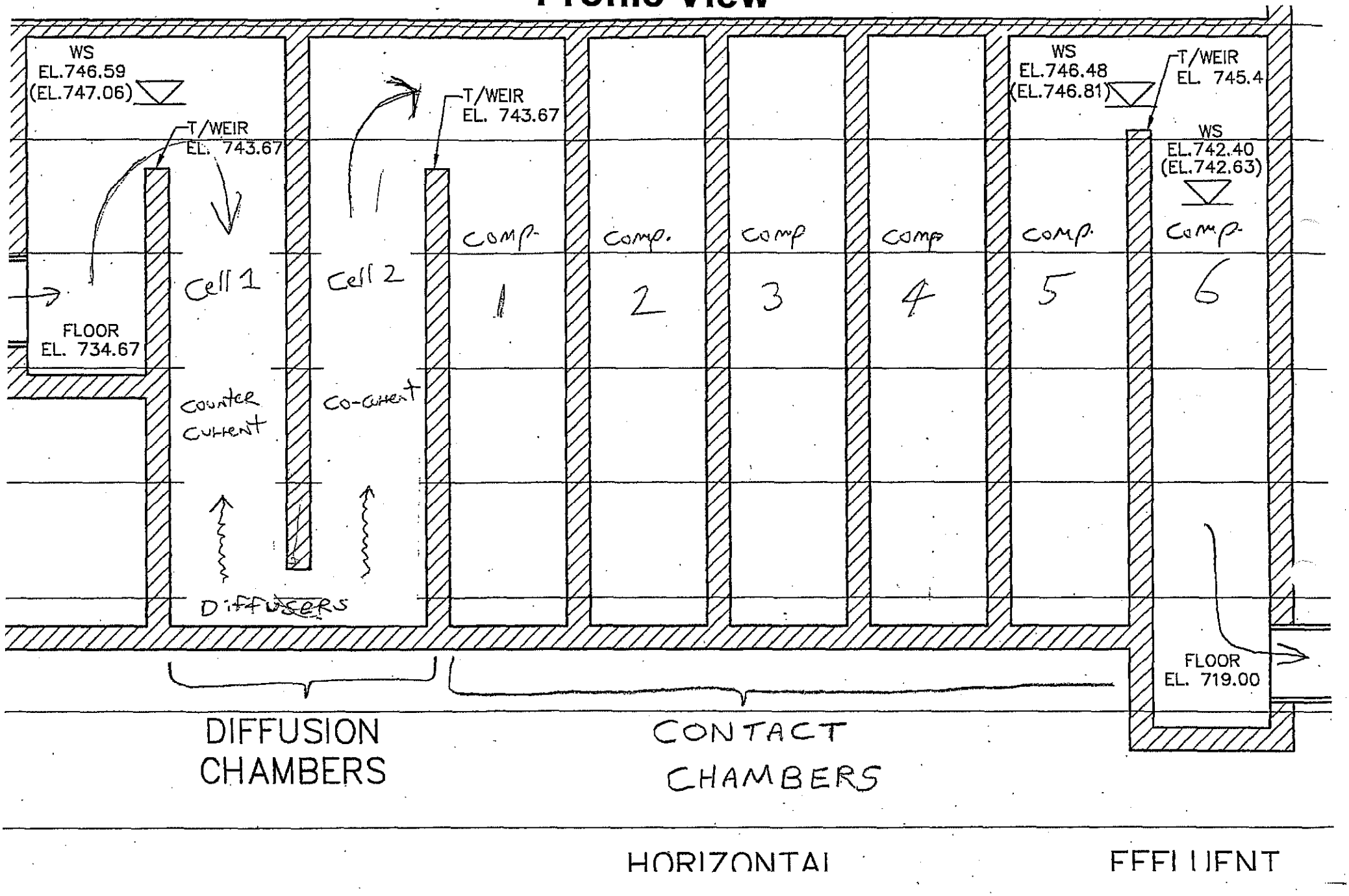
MAXIMUM	2.7	2.6	3.0
MINIMUM	1.8	0.4	0.7
AVERAGE	2.1	1.2	1.6

APPENDIX G

Ozone Contactor Basin Diagram


000467
1 1/2-OZ-SS UP (TYP.,
WALL MOUNTED HOSE REEL
PI
EQUIPMENT LIFT
B
OZM9
5'
12
3/4-SW-CU2 (TYP.)
23
Comp 1
3/4-SA-SS
℄ EL. 743.0 (TYP. OF 3)
7
Diff chamber
cell 1
ELR. EL. 723.5
OZONE DIFFUSERS SECTION
SEE SECTION 2, OZM13
(TYP.)
23
4.83
Comp 2
32 33
Comp 3
C
OZM13
SAMPLE PENETRATION
(TYP)
Comp 4
TYPICAL CONTACTOR DRAIN PIPING
Comp 5
3/4-SA-SS
℄ EL. 732.0 (TYP. OF 3)
24
23
5
Comp 6
3/4-HSW-CU2 UP

Ozone Contactor Basin (1 of 3)
Profile View



APPENDIX H

C*T Calculation

Flint WTP CT Calculation

1. Ozone: @ 12 MGD per contacter train

		HRT	T10	O3 Conc.	CT
Diffusion Chamber Cell 1	Counter Current	0.72 min	0.36 min		
Diffusion Chamber Cell 2	Co-Current	0.72 min	0.36 min		
Contact Chamber 1		1.76 min	0.88 min		
Contact Chamber 2		3.22 min	1.61 min		
Contact Chamber 3		3.22 min	1.61 min		
Contact Chamber 4		3.22 min	1.61 min		
Contact Chamber 5		3.22 min	1.61 min		
Contact Chamber 6		2.48 min	1.24 min		

3 ozone monitoring points: end of diffusion cell 2, end of chamber 3, end of chamber 6

Ozone concentrations are as follows: Diff Cell 1 - 0.15 mg/l - dectable residuals are not maintained through Chambers #3 and 6; thus they cannot be used in the CT dtm.

Dosage Diffusion Chamber Cell 1: Counter - Current Flow

Cell 1 cannot be credited CT since the ozone concentration is not measured at the exit point of Cell 1 prior to the second ozone diffuser in Cell #2.

$C = C_{out} = 0.00$ mg/l
$C_T = C \times T_{10}$
$C_T = 0.0$ mg/l X 0.36 min = 0.000 min - mg/l

C_T needed for 3 - Log removal of giardia @ 0.5 deg. C - 2.9 min - mg/l
C_T needed for 4 - Log removal of virus @ 0.5 deg. C - 1.8 min - mg/l

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.9}$ = 0.000 min-mg/l/2.9 min-mg/l = 0.00
Giardia Inactivation: 3 X inactivation ratio or 3 X 0.00 = **0.0**

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.9}$ = 0.000 min-mg/l/1.8 min-mg/l = 0.00
Virus Inactivation: 4 X inactivation ratio or 4 X 0.00 = **0.0**

Dosage Diffusion Chamber Cell 2: Co - Current Flow

$C = (C_{out} + C_{in})/2$
C = (0.15 mg/l + 0.00 mg/l)/2 = 0.075 mg/l

$C_{T\ calc} = CXT$ = 0.075 mg/l X 0.36 min = 0.027 min - mg/l

C_T needed for 3 - Log removal of giardia @ 0.5 deg. C - 2.9 min - mg/l

C_T needed for 4 - Log removal of virus @ 0.5 deg. C - 1.8 min - mg/l

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.9}$ = 0.027 min-mg/l/2.9 min-mg/l = 0.0093
Giardia Inactivation: 3 X inactivation ratio or 3 X 0.0093 = **0.028**

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.99}$ = 0.027 min-mg/l/1.8 min-mg/l = 0.015
Virus Inactivation: 4 X inactivation ratio or 4 X 0.015 = **0.06**

Six Ozone Contact Chambers:

No credit given since ozone residual cannot be maintained consistantly through the contact chambers.

Total giardia inactivation (Ozone process) = 0.028 log removal

2. Intermediate Chlorination: Intermediate CL2 added at plate settler effluent

Lime softening solids contact unit detention times:

East unit: 114 min @ 19 MGD
West unit: 118 min @ 17 MGD

Assume baffle factor of 0.5 and use east basin for CT calc.

T10 = 114min X 0.5 = 57 min

Assume pH 7.5, Temp 0.5 C, lowest CL2 on MOR - 0.1 mg/l

CT = 0.1 mg/l X 57 min = 5.7 min-mg/l

CT needed for 0.5 log removal giardia (pH 7.5, 0.5 C, CL2 < 0.4) = 40 min-mg/l
CT needed for 2 log virus removal is 6 min-mg/l

Giardia inactiviation ration:

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.9}$ = 5.7 min-mg/l/40 min-mg/l = 0.143 min-mg/l
Giardia Inactivation: 0.5 X inactivation ratio or 0.5 X 0.143 = **0.072 min-mg/l**

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.99}$ = 5.7 min-mg/l/ 6min-mg/l = 0.95
Virus Inactivation: 2 X inactivation ratio or 2 X 0.95 = 1.9

Total giardia inactiviation (contact unit): 0.072 min-mg/l

3. CT Credit through Filtration: 12 filters total at 3.0 MGD each

Water depth above filter - 7.92 ft, media thickness - 2.5 ft.

Volume: 700 sqft X (7.92 ft + 2.5ft) = 7,244 Cuft or 54,559 gallons

DT= 54,577 gal/3,000,000 gpd = 26.2 min

Assume BF of 0.7, thus T10 = 0.7X26.2 min = 18.3 min

CT = 0.1 mg/l X 18.3 min = 1.83 min-mg/l

CT needed for 0.5 log removal giardia (0.5 deg, pH 7.5, CL2 <0.4) = 40 min-mg/l
CT needed for 2 log removal virus = 6 min-mg/l

Giardia inactiviation ratio; 1.83 min-mg/l/40 min-mg/l = 0.046
Giardia inactiviation ; 0.5 X 0.046 = 0.023

Virus inactiviation ration; 1.83 min-mg/l/6 min-mg-l = 0.31
Virus inactiviation ; 2.0 X 0.31 = 0.62

Total giardia inactiviation (filters): 0.023 min-mg/l

2. Post Chlorination:

The Flint WTP can add chlorine to their 3 MGAL well during emergency operation. The following calculation is based upon a flow rate of 12 MGD and using a reservoir baffling factor of 0.3. Since the chlorine demand is used up during intermediate chlorination, a chlorine residual of no less than 1.0 mg/l in the clearwell (after post chlorination) is easily attainable. For the purpose of the CT calculation, a 1.0 mg/l free chlorine residual is used.

Assume: 0.5 deg C, pH 7.5 - unsoftened, 1.0 mg/l CL2

Detention Time (D_T) = 3,000,000 Gal/13,000,000 GPD = 0.25 days or 360 minutes

T10 (based on CL2 analyzer test) was 120 min on first test and 100 minutes on 2nd test.

Baffle factor = T_{10}/D_T = 100/360 = 0.28

C_T = CL2 X 0.3(D_T) = 1.0 mg/l X 0.28(360 minutes) = 100 mg/l - min

C_T needed for 1/2 - Log removal of giardia @ 0.5 deg. C - 42 min - mg/l
C_T needed for 2 - Log removal of virus @ 0.5 deg. C - 6 min - mg/l

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.9}$ = 100 min-mg/l/42 min-mg/l = 2.38
Giardia Inactivation: 0.5 X inactivation ratio or 0.5 X 2.38 = **1.19**

Inactivation Ratio: $C_{T\ calc}/C_{T\ 99.99}$ = 100 min-mg/l/ 6min-mg/l = 16.7
Virus Inactivation: 2 X inactivation ratio or 2 X 16.7 = **33.4**

Total giardia inactivation = 1.19 log removal
Total virus inactivation = 33.4 log removal

3. Total Process:

Total giardia inact. = log removal (O3 + int. CL2 contact units & fliters + clearwell)

= 0.028 + 0.072 + 0.023 + 1.19 = 1.31 Log removal

Total virus inact, = log removal (O3 + CL2 in contact units & filters + clearwell)

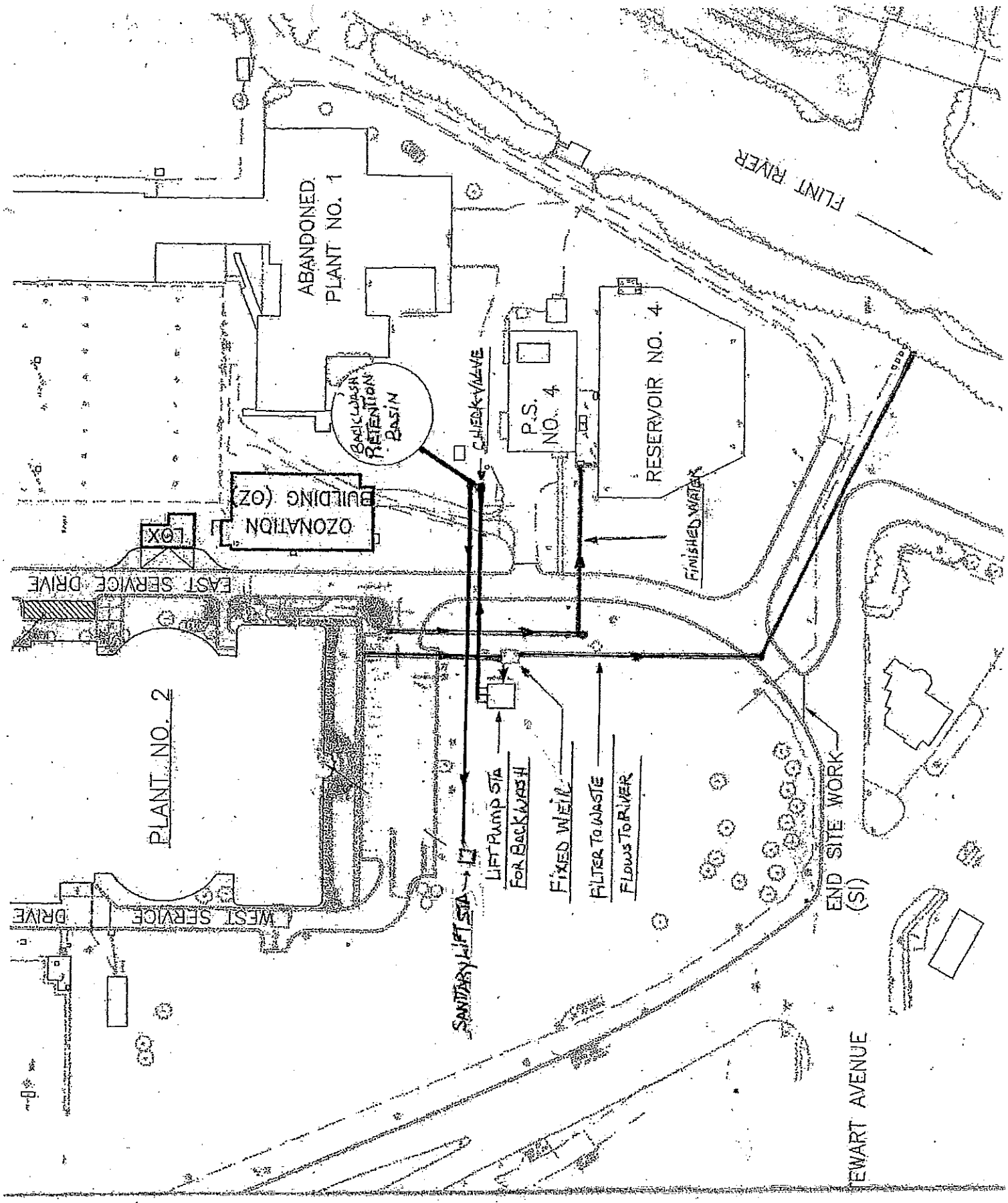
= 0.06 + 1.9 + 0.62 + 33.4 = 36 Log removal

4. Conclusion:

Based upon the available treatment, assumptions, and calculations above, the Flint WTP has can provide adequate CT.

APPENDIX I

Waste Water Flow Schematic

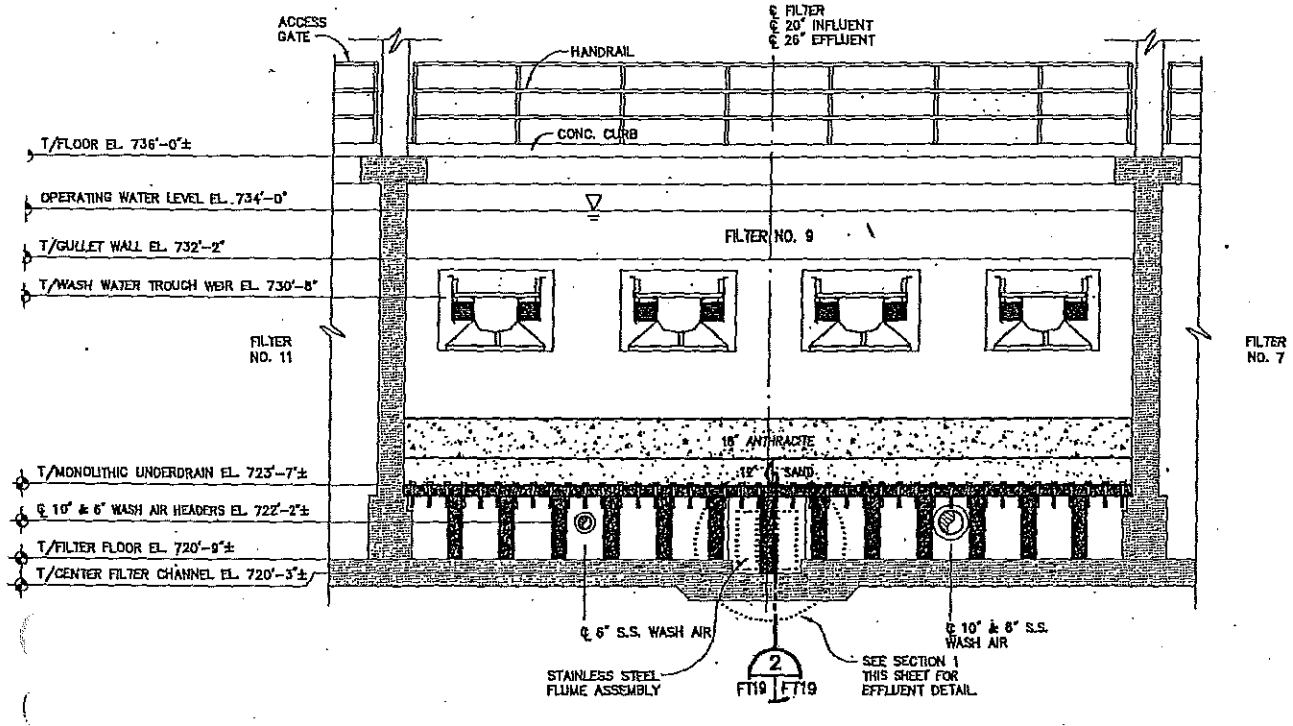


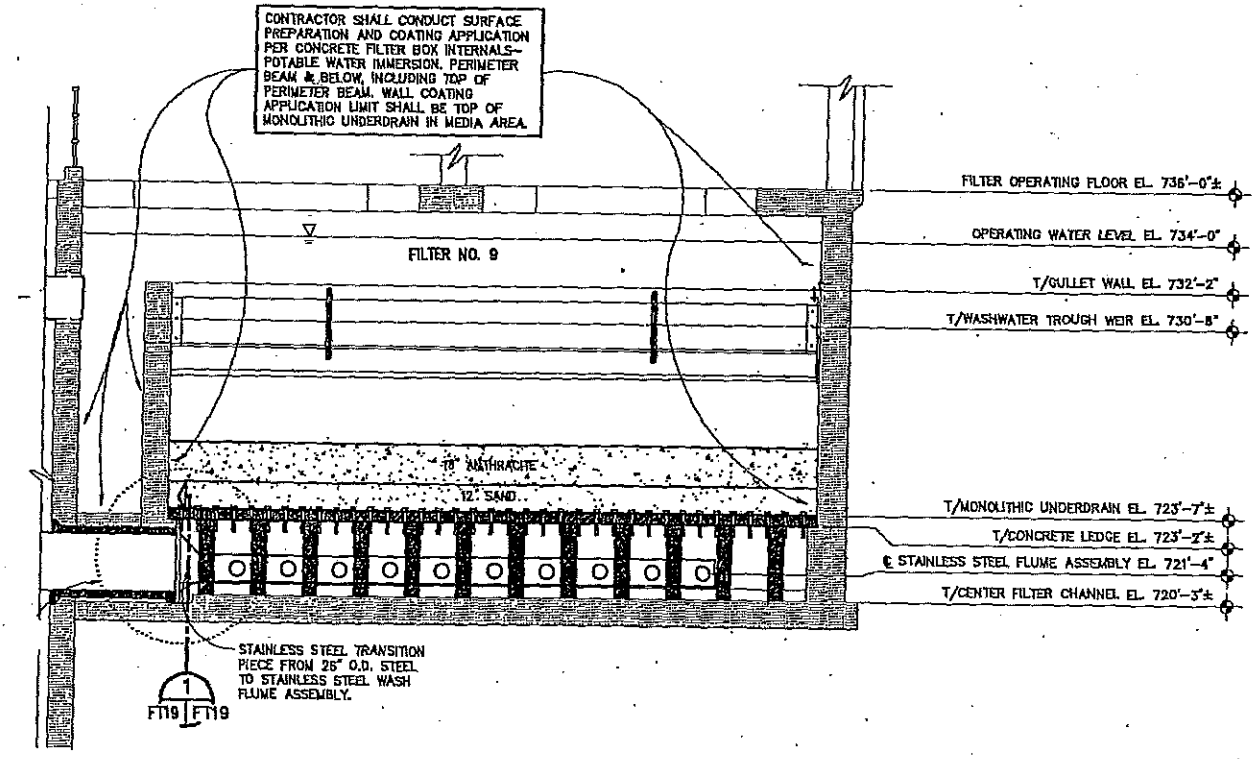
DURING NORMAL PLANT RUN TEST OPERATION FINISHED WATER EXITS PLANT THROUGH FILTER TO WASTE. IT FLOWS OVER FIXED WEIR AND ENTERS THE RIVER.

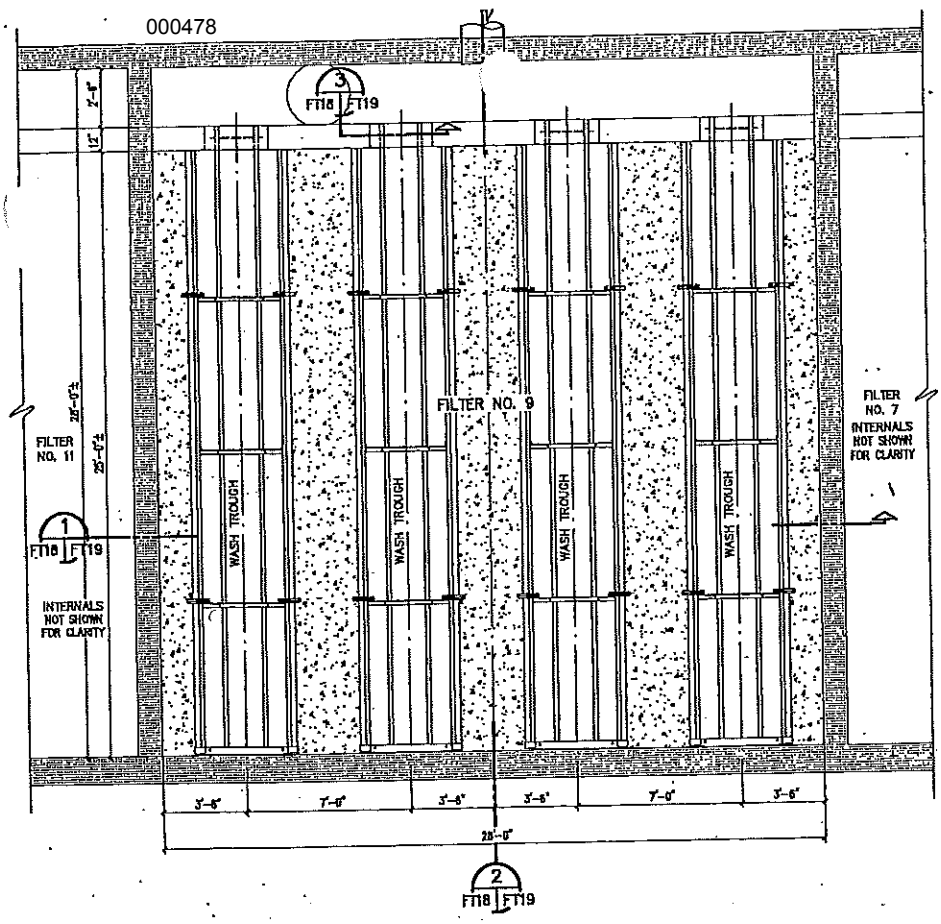
DURING BACKWASH WATER FLOWS THROUGH FILTER TO WASTE, PUMPS ARE TURNED ON IN BACKWASH LIFT PUMP CHAMBER. THE WATER IS PUMPED TO BACKWASH RETENTION BASIN. THE PUMPS KEEP THE LEVEL BELOW THE WEIR AND FROM ENTERING THE RIVER AND FLOW FROM BASIN TO SANITARY

APPENDIX J

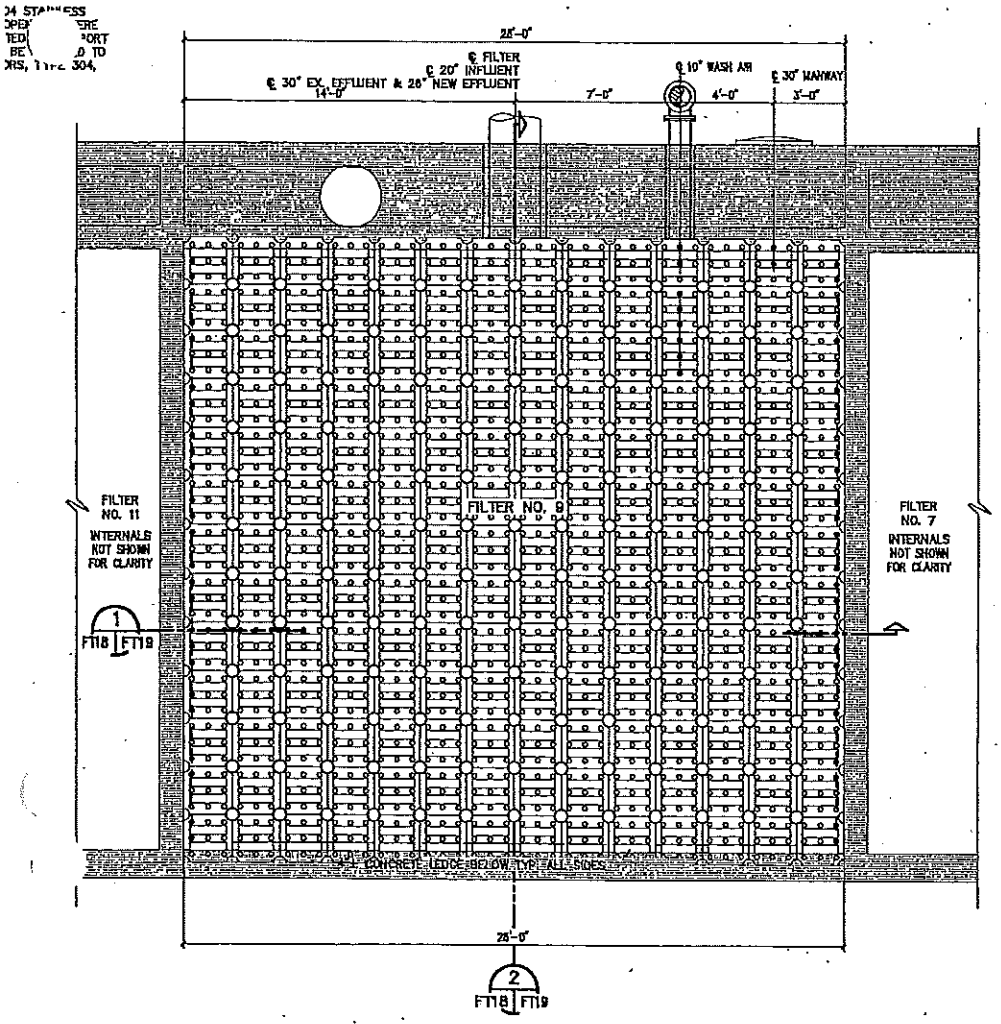
Filter Schematic


ACCESS GATE
℄ FILTER
℄ 20" INFLUENT
℄ 26" EFFLUENT
HANDRAIL
CONC. CURB
T/FLOOR EL. 736'-0"±
OPERATING WATER LEVEL EL. 734'-0"
T/GULLET WALL EL. 732'-2"
T/WASH WATER TROUGH WEIR EL. 730'-8"
FILTER NO. 9
FILTER NO. 11
FILTER NO. 7
18" ANTHRACITE
12" SAND
T/MONOLITHIC UNDERDRAIN EL. 723'-7"±
℄ 10" & 6" WASH AIR HEADERS EL. 722'-2"±
T/FILTER FLOOR EL. 720'-9"±
T/CENTER FILTER CHANNEL EL. 720'-3"±
℄ 6" S.S. WASH AIR
℄ 10" & 6" S.S. WASH AIR
STAINLESS STEEL FLUME ASSEMBLY
2
FT19 FT19
SEE SECTION 1 THIS SHEET FOR EFFLUENT DETAIL

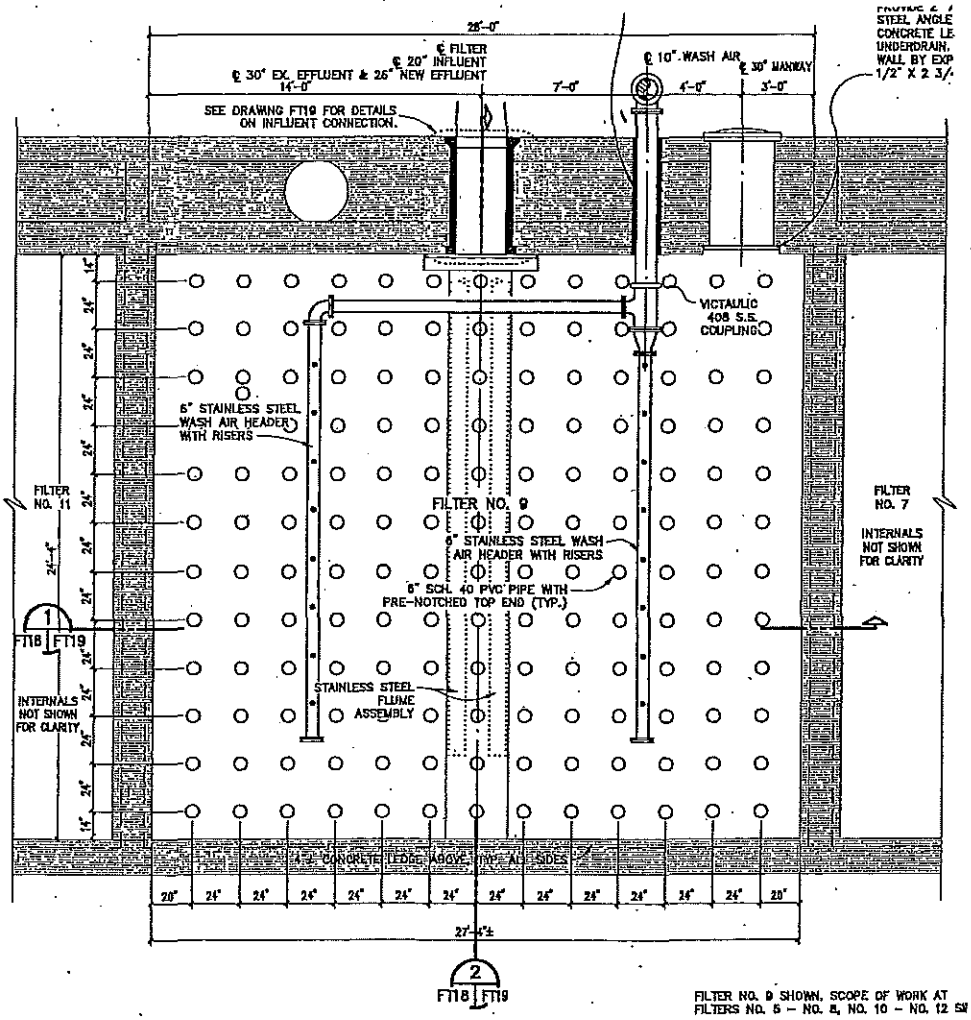

CONTRACTOR SHALL CONDUCT SURFACE PREPARATION AND COATING APPLICATION PER CONCRETE FILTER BOX INTERNALS-POTABLE WATER IMMERSION. PERIMETER BEAM & BELOW, INCLUDING TOP OF PERIMETER BEAM. WALL COATING APPLICATION LIMIT SHALL BE TOP OF MONOLITHIC UNDERDRAIN IN MEDIA AREA.
FILTER OPERATING FLOOR EL. 736'-0"±
OPERATING WATER LEVEL EL. 734'-0"
FILTER NO. 9
T/GULLET WALL EL. 732'-2"
T/WASHWATER TROUGH WEIR EL. 730'-8"
18" ANTHRACITE
12" SAND
T/MONOLITHIC UNDERDRAIN EL. 723'-7"±
T/CONCRETE LEDGE EL. 723'-2"±
℄ STAINLESS STEEL FLUME ASSEMBLY EL. 721'-4"
T/CENTER FILTER CHANNEL EL. 720'-3"±
STAINLESS STEEL TRANSITION PIECE FROM 26" O.D. STEEL TO STAINLESS STEEL WASH FLUME ASSEMBLY.
1
FT19 FT19



FILTER PLAN – EL. 732'



FILTER PLAN – EL. 724'



FILTER NO. 9 SHOWN, SCOPE OF WORK AT FILTERS NO. 5 – NO. 8, NO. 10 – NO. 12 SI

FILTER PLAN – EL. 722'

SCALE : 1/4" = 1'-0"

2310

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 18, 2013

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

WSSN: **02310**

Dear Mr. Johnson,

SUBJECT: City of Flint, Water Distribution System Sanitary Survey

This letter confirms my visits with Mr. Robert Bincsik, Mr. Brent Wright, and Mr. Glen Thomas on December 13, 2012, December 18, 2012, and January 16, 2013, and summarizes the subsequent review and discussion of the water supply facilities serving the city of Flint. The purpose of this meeting was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). In addition, the enclosed Water System Sanitary Survey was updated to gather information on the Flint water distribution system.

Our updated survey visit confirms that the City of Flint Water System Reliability Study – Phase I has been completed and our review comments for Phase 2 were provided to your consultant. The survey also acknowledges some improvement in the city's hydrant and valve program; however deficiencies in the valve program need to be corrected.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source (Including P.S. 4)	Not Applicable – see WTP
Treatment	Not Applicable – see WTP
Distribution System	**Deficiencies Identified**
Finished Water Storage	Recommendations made
Pumps (All dist. Pumping)	**Deficiencies Identified**
Monitoring & Reporting	Recommendations made
Management & Operations	Recommendations made
Operator Compliance	Recommendations made

Security	Recommendations made
Financial	Recommendations made
Other	Not Applicable

The following deficiencies are violations of Act 399 and must be resolved in order to return the water system to compliance.

1. R 325.11108 (1) of the Act 399 requires a Type-I public water supply (PWS) to provide sufficient distribution system valving to minimize interruptions in service and minimize sanitary hazards during construction or repairs. R 325.11111 (1) of Act 399 requires a Type-I PWS to maintain adequate records on the operation of the water distribution system, including the location and type of maintenance, and the type of materials and appurtenances used. As part of meeting these requirements, further work is needed towards correcting the deficiencies in the valve program. Accurate records need to be completed for approximately one third of the remaining valves and a valve maintenance program needs to be established. Adequate level of staffing and acquisition of a reliable vehicle to transport the Water Distribution Division's (WDD) valve turning machine are needed in order to establish an effective valve program.

2. Establish financial capacity to provide reserve funds for transmission/distribution improvements outlined in the city's capital improvement program (CIP). R 325.11105 (1) of Act 399 requires water distribution systems to have sufficient capacity to meet peak demands including fire flow demands where fire protection is provided and maintaining minimum pressures of 35 pounds per square inch (psi) for domestic service and 20 psi during emergencies, including firefighting. Phase 2 of the Reliability Study (RS) (draft) identifies areas in the western portion of the city that don't appear to meet the minimum criteria. The condition of the west transmission system limits the ability to provide the desired level of fire protection in the Martin Luther King Boulevard, Welch Road, DuPont Street, and Pasadena Avenue corridor. A construction permit to replace deficient transmission piping along this corridor has been issued several times; however, the city has not proceeded with replacing the main. The RS has also identified other distribution – transmission improvements that are needed and are included as part of the proposed 6-year CIP.

   The city needs to proceed with water distribution system improvements in accordance with the 6-year CIP. Please provide us with a response as to how the city intends to correct water distribution system deficiencies. Critical steps need to include; identifying an adequate rate structure (discussed in the recommendations section), developing a prioritized capital improvements plan, and establishing a timeline by which these objectives and major projects are completed.

3. R 325.11011 of Act 399 requires a pumping facility to have sufficient capacity to meet the service area demands with the largest unit removed from service. R 325.11206 requires the PWS to be capable of providing a continuous supply of finished water to the entire distribution system during periods when normal power

service is interrupted. The Torrey Road pump station has only one operable pump along with no provisions for stand-by power. This facility plays an important role in providing adequate water service to the western portions of the city including the Hospital Hill area. The Cedar Street pump station lacks stand-by power and is also critical in maintaining adequate service to Flint's distribution system. Also, the condition of the electrical switchgear and lack of replacement parts at the Cedar Street station compromises the reliability of the pump station and must be addressed.

It is our understanding that the city intends to proceed with an upgrade of the Torrey Road station in 2013 and that adequate funds are in place for the work. The city needs to proceed with and complete the work needed at this station. Finally, we are requesting the city to respond to our office by no later than June 21, 2013, with a proposed timeframe by which the electrical improvements and stand-by power provisions can be completed at the Cedar Street station.

4. R 325.11602 of Act 399 requires the city of Flint to have a current water system general plan. The general plan is required to show the general layout of the entire water system, including treatment systems and distribution system, and the location of valves, hydrants, storage tanks, watermains, pumps, wells, and pumping facilities. Based upon our survey visit, the Water Service Center (WSC) has an outdated water system general plan that was prepared in 1991. R 325.11603 of Act 399 (2) requires the city of Flint to provide an updated general plan within 6 months of receiving written notification from the DEQ. The city's 1991 water system general needs to be updated and a similar sized copy be provided to WSC and water treatment plant (WTP) staff by no later than November 1, 2013.

Next, it is hoped that the following recommendations will prove useful in enhancing the operation and maintenance of your water supply.

1. Perform an inspection of the 3.0 million gallon well and, if needed, complete repairs on the concrete base around each manhole vent. A copy of an inspection report or summary of the inspection should also be provided to the DEQ.

2. Perform an inspection of the Cedar Street reservoir and provide the DEQ with a copy of the inspection report.

3. The DEQ encourages the city to maintain its efforts towards promoting and maintaining operator certification. Also, select a water distribution system back-up operator. The back-up operator must hold an active S-4 (or higher) distribution system license.

4. Complete Phase 2 of the RS in accordance with R 325.11203 of Act 399 that address our review questions/comments from the draft report and provide the DEQ with a final copy for review and approval.

5. We encourage the city of develop a rate structure that incorporates full cost pricing to allow for water system capital improvements to proceed. Phase 2 of the RS outlines the development of an asset management program that will play an important role in assisting the city in establishing an adequate water rate structure. The city needs to continue working with their consultant towards establishing an effective asset management program and an on-going CIP. We will also be discussing future requirements that the city will need to meet regarding asset management and maintaining an active CIP.

6. WTP staff prepare a WTP operation report each time the WTP is placed into operation (routine test run or emergency operation). The scope of operation report that reflects WTP emergency operation needs to be expanded to include the average, maximum, and minimum values for the critical treatment parameters (turbidity, chemical applied, etc.).

7. Additional clerical assistance may be needed for recordkeeping, reporting, and maintaining cross connection control program (CCCP) inspection schedules. The CCCP workload should be reviewed to determine the level of staffing needed to maintain effective program implementation.

8. WTP staff have prepared a draft water system Emergency Response Plan (ERP). The draft ERP needs to be finalized and include discussion of the various plans and agreements that are in place and can be utilized in mitigating water related emergencies. Such plans include; water system general plan, safety plans, water quality monitoring plans, and mutual aid agreements. The ERP also needs to include a water shortage response plan. The water shortage response plan needs to address various water shortage scenarios specific to Flint, including; an interruption in water service from the Detroit Water and Sewerage Department, large distribution/transmission break, loss of one or more pumping stations, etc. The ERP will serve as part of mitigating these water related shortages. The water shortage response plan will also need to be included with the RS and has been discussed with your consultant.

   The use of swimming pool chlorine for emergency water system disinfection must be removed from the ERP. Any compound used for water distribution disinfection shall be an ANSI/NSF Standard 60 approved product in accordance with R 325.12102 of Act 399.

9. Maintain adequate communication between the WDD and the fire department concerning hydrant color coding, hydrant use, and condition of hydrants. We also recommend that WDD operators estimate the volume of water used for flushing. This will help to determine the component of unaccounted water due to flushing. We also concur with the WSC's procedure that local contractors must follow to use hydrants for obtaining service water. We also encourage the installation of a filling station at the WSC to further serve this purpose.

Please submit a letter by *June 21, 2013,* that outlines the city of Flint's plans and schedule to address the above items.

If you have any questions, feel free to contact me at (517) 335-6122; prysbym@michigan.gov; or Department of Environmental Quality, Office of Drinking Water and Municipal Assistance, Lansing District Office, 525 West Allegan Street, 4th Floor North, 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

Enclosure
mfp/jlr

cc: Mr. Robert Bincsik, Water Distribution Supervisor
Mr. Brent Wright, Water Plant Superintendent
Mr. Edward Kurtz, Emergency Manager, City of Flint
Mr. Howard Kroft, Utilities Director, City of Flint
Ms. Inez Brown, Clerk, City of Flint

DEQ Office Address 1
DEQ Office Address 2
Phone:
Fax:

WSSN: 2310

Office of Drinking Water and Municipal Assistance

Lansing District Office

Water System Sanitary Survey

Flint Water System - Water Distribution

Jan-13

Sanitary S ey of Community Water Supply - Review Summ.

Water Supply: City of Flint - Distribution
County: Genesee
Evaluator: Michael Prysby

WSSN: 02310
District: 11
Date: 1/16/2013

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source		x					
Construction & Maintenance		x					
Standby Power		x					
Isolation		x					
Source Water Protection		x					
Capacity		x					
Treatment		x					
Disinfection		x					
Fluoride		x					
Phosphate Addition		x					
Softening		x					
Iron/Manganese Removal		x					
Arsenic Removal		x					
Pretreatment		x					
Filtration (gravity or membranes)		x					
C*T		x					
Other		x					
Distribution System						x	
Interconnections w/ Other WS				x			
Hydrants & Valves						x	
Service Lines & Metering				x			
General Plan						x	
Cross Connections					x		
Construction & Maintenance						x	
Capacity					x		
Finished Water Storage					x		
Construction & Maintenance					x		
Controls				x			
Capacity				x			
Pumps (All Pumping Facilities)						x	
Construction & Maintenance						x	
Controls						x	
Capacity				x			
Monitoring & Reporting					x		
Bacteriological Monitoring				x			
Chemical Monitoring				x			
MOR or Annual Pumpage Report					x		
Consumer Confidence Report				x			
Analytical Capabilities				x			
System Management & Operations					x		
Owner Responsibility				x			
Capacity Development			x				
Reliability Study					x		
Operations Oversight				x			
Permits				x			
Operator Compliance							
Operator Certification					x		
Technical Knowledge & Training					x		
Security							
Emergency Response Plan					x		
Site Security (Fences, Alarms...)				x			
Financial							
Rates					x		
Budget & Capital Imp. Plan					x		
Other		x					

N/A - Not Applicable
NotEv - Not Evalı NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencie SigDef - Significant Deficiencies Identified

WATER SYSTEM REVIEW (Distribution)

GENERAL

Basic Information

WSSN:	2310	Supply:	City of Flint	County:	Genesee
Dates:	12/18/2012 & 1/16/2013	Reviewed by:	MFP	District:	11

Primary Contact:	Robert Bincsik	Copy To:	Brent Wright	Glen Thomas
SDWIS Role		SDWIS role		
Title:	Water Distribution Supv	Title:	WTP Supervisor	Inspector
Telephone:	810-766-7359	Telephone	810-787-6537	810-787-6537
Cell Phone:		Cell Phone:	810-691-0355	
Pager:		Pager:		
Fax:		Fax:		
e-mail:		e-mail:		

Address:	Flint Water Service Ctr	Address:	Flint Water Plant	Utilities/Cross
	3310 East Court St		4500 N. Dort Hwy	Connection Division
	Flint, MI 48506		Flint, MI 48505	5400 N. Dort Hwy

Population:	102,400	Year:	2010	Basis:	2010 Census

Operator Certification

Distribution Class: S-1

Operator in Charge:	Robert Bincsik	Cert.:	S-1, F-4
Back-up Operator:			
Other Operators:	Jeff Church		S-3
	Mark Pavwoski		S-3 - lapsed
	Paul Simpson		S-2
	Howard Swickard		S-2

Do the operators receive adequate training? yes
If not, what and why?

Flint purchases water from Detroit from the Detroit-Lake Huron WTP and is transmitted to the city via the 72-inch transmission main (pipeline). Water enters Flint's portion of the pipeline at the Baxter & Potter metering station and is then transmitted to Control Station #2 at the Flint WTP. Control Station #2 directs water to the 20 Mgal Dort Reservoir and the 2 Mgal elevated tank. Water from the Dort Reservoir is directed to a smaller 3 Mgal reservoir at Pump Station #4. Pump Station #4 distributes water to Flint's distribution system that consists of approximately 550 miles of piping ranging from 2-inch to 42-inch. The distribution system has substantial storage volume (57 MGAL) provided by 5 storage facilities. The distribution system also has an in-line pump station at Torrey Road and two pump stations (Cedar Street and Westside) with adjacent storage (12 Mgal and 20 Mgal respectively) .

Ownership

Ownership: City
Annual Fee paid to date

Operator Comments

The city of Flint water distribution system is operated and maintained by the Utilities Department. The Utilities Department is broken down into five operating divisions or cost centers out of which three play a key role in operating and maintaining the water distribution system. These divisions are: The Water Service Center, The Water Treatment Plant, and the Utilities/Cross Connections Division. Appendix A Illustrates the structure and the Utilities Dept. and the various cost centers.

The Water Service Center's (WSC) structure is broken down into two divisions, Water Distribution Division (WDD) and Sewer Maintenance Division. The WDD, supervised by Robert Bincsik, is responsible for operating and maintaining the water distribution system piping, hydrants, and valves. The WDD also conducts meter reading, replaces meters, and maintains distribution system records and maps. The WDD is broken into two main branches. One branch focuses mainly on watermain operation and maintenance while the other branch is dedicated to meters. The WDD has not designated the back-up operator in charge.

Both branches have numerous operators at various levels of employee responsibility. Appendix A Illustrates the employee organizational chart for the WDD and shows the certification requirement among the various positions. The water distribution supervisor and foreman positions are required to have S-1 and S-2 certification respectively.

The water treatment plant (WTP) staff, supervised by Brent Wright, operates and maintains Flint's stand-by WTP (reference WTP Sanitary Survey). WTP staff; however, play an important role in distribution system activities including; operation and maintenance of the city's distribution system pumping stations, storage facilities, and points of connection to other water supplies. WTP staff also maintain some of the key programs including both the bacteriological and lead and copper monitoring programs. Finally, the WTP staff are responsible for monthly operation reporting, emergency response planning, and public relations.

The Utilities/Cross Connection Division, also supervised by Brent Wright, is responsible for implementing the city's Cross Connection Control Program. The division has one employee, Glen Thomas, who is responsible for conducting the routine inspections and maintaining records. A second employee, Yolanda Gray, assists with recordkeeping and reporting.

MDEQ Conclusions/Recommendations

Promotion of operation certification has improved. Although operators are responsible to obtain and maintain their certification, the city reimburses their cost. We are pleased that the city is promoting operator certification through reimbursement of the cost of operator training. Certified operators help to protect a utility's investment in their water system and to meet the Safe Drinking Water Act's requirements. We encourage the city to maintain this level of effort towards promoting operator certification.

The city has also selected Mr. Robert Bincsik as the designated Operator-in-Charge (OIC) for the water distribution system which fulfills the Michigan Safe Drinking Water Act's requirement of having a designated water distribution system OIC. The city; however, also needs to select a Back-up operator for the water distribution system. The designated back-up operator must hold an active S-4 (or higher) distribution system license.

Construction Permit History:

Below is a listing of projects that were completed to improve the reliability of the distribution system pumping facilities, distribution piping, and stand-by treatment facilities.

CP Number	Date	Project	Description
W891667	1/2/1989	Revisions to P.S. 4	CI Facilities at P.S. 4
W931368	11/30/1993	P.S. 4 Improvements	Two 20 MGD high service pumps, one 6 MGD high service pump, valving, appurtenances, etc.
W941607	12/1/1994	Westside Reservoir	Replacement of roofing system, masonry restoration and repairs to expansion joints.
W941678	12/20/1994	C.S. 3 & Dort. Reservoir Inlet	Installation of PRV's at Dort Reservoir and C.S. 3.
W991021	3/23/1999	Cedar St. P.S. Valve Repl.	Replacement of pump control valves and installation of butterfly valves for each pump.
W991027	3/10/1999	GM	Replacement of 24" trans. main at GM to
W991208	6/21/1999	Transmission main Repl.	serve expansion of facility
W041019	2/24/2004	Beech and Wellington St. WM Replacement	
W041082	6/1/2004	Pierson Rd WM Replacement	
W051038	3/28/2005	Buckingham Alley WM Replacement	
W051127	8/1/2005	Sugar Maple Farms development	
W061054	4/6/2006	Chevrolet Ave WM Bridge Crossing	
W061184	9/26/2006	Flushing Road WM Repl - 6800 LF of 12-in WM	
W071001	1/3/2007	3rd Avenue WM Repl	
W071096	7/18/2007	Webster Road WM Repl - 2800 LF of 8-in WM	
W071098	7/18/2007	Saginaw Street WM Repl - 2300 LF of 16-in WM	
W071161	11/6/2007	Brush Alley WM	

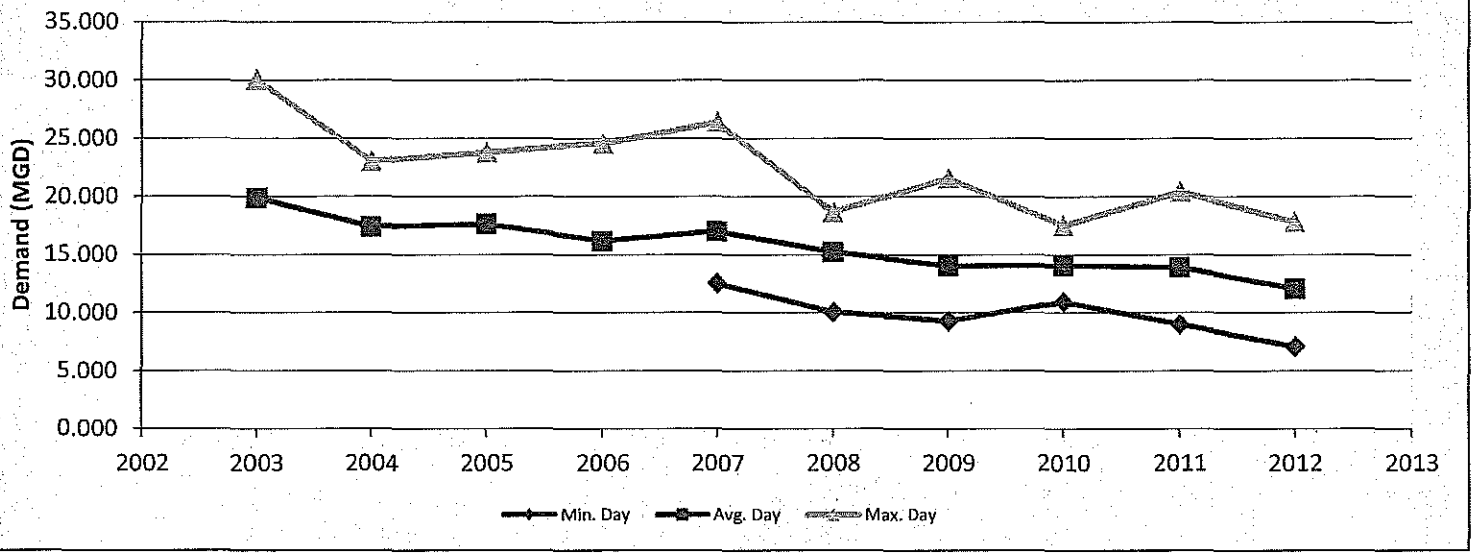
Construction Permit History Continued:

CP Number	Date	Project	Description
W081081	7/14/2008	Holly Ave WM	
W081077	7/3/2008	Williams Street Relocation	
W091052	7/1/2009	Kettering Gateway Project	
W091080	11/23/2009	Chevrolet Ave WM Repl - 1100 LF of 16-in WM	
W101002	1/15/2010	Clio Rd WM Repl - 2500 LF of 12-in WM	
W101028	5/27/2010	MKL Ave WM Repl - 5900 LF of 12-in WM	
W111032	5/17/2011	Smith Village Redevelopment	
W121072	11/1/2012	Cedar Street Pump Station Improvements	
W121073	11/7/2012	Torrey Road Pump Station Improvements	

SOURCE

Capacity

Year	Demand (MGD) Max. Day	Date	Avg. Day	Min. Day	Date	Max/Avg	Population History	G/C/D	% unacct.H_2O
2003	30.050		19.900			1.51005			
2004	23.040		17.400			1.324138			
2005	23.790		17.640			1.348639			
2006	24.550		16.190			1.516368			
2007	26.380		17.020	12.530		1.549941			
2008	18.660		15.230	10.060		1.225213			
2009	21.570		14.030	9.280		1.53742			
2010	17.500		14.090	10.950		1.242016	102,400	137.6	
2011	20.410		13.920	9.010		1.466236	102,400	135.9	65%
2012	17.820		12.070	7.070		1.476388	102,400	117.9	



Five Year Max. Day	21.570
Ten year Max. Day	30.050
Five Year Avg. Day	13.868
Max Day for capacity requirements:	30.050

Purchase Contract

Principle Parities of Contract: Flint & DWSD

Date of Contract: No contract

Expiration Date: year to year

Annual Volume Available by Contract:		MG
Maximum Day Available by Contract:	>70.0	MGD
Maximum Hour Available by Contract:		GPH
Maximum Pressure Allowed by Contract:		PSI
Minimum Pressure Required by Contract:		PSI

Comments:
Flint's average day and maximum day demand continues to decrease due to the continued loss of residential and industrial customer base.

.it has not signed a new water service contract with the DWSD. Their agreement to maintain water service from the DWSD is renewed on a yearly basis.

STORAGE

Construction, Controls & Maintenance

	Location: Dort Reservoir	Location: WTP	Location: WTP	Location: Cedar St	Location: Westside
SDWIS Fac. ID					
Volume	20 MG	2 MG	3 MG	20 MG	12 MG
Type	ground	elevated	ground	ground	ground
O.F. Elevation					
Date Constructed	1966	1952	1948	1948	1970
Date Inspected	**2008**	**2012**	**1996**	**1997**	**2012**
Date Painted Inside	na	1996	na	na	na
Paint System	na	epoxy	na	na	na
NSF Std 61 Compliant (Y/N)					
Date Painted Outside	na	1996	na	na	na
Cathodic Protection	na	yes	na	na	na
Tank Isolation Valve	yes	yes	yes	yes	yes
Tank Drain (Hydrant)		yes			
Altitude Valve		yes			
Mud Valve		yes			
High Alarm	yes	yes	yes	yes	yes
Low Alarm	yes	yes	yes	yes	yes
Type					
Total Head Range (Feet)		161.7 ft-175.6 ft			
Normal High Water Level			15 ft	18 ft	17 ft
Normal Low Water level			11 ft	15 ft	8 ft
Range of Operation ft	730-750	898	708.5-726	737.2-757.2	761.8-779
Normal/Average Pressure					
Data recording system	SCADA	SCADA	SCADA	SCADA	SCADA
Control Signal Type	analog to digital	analog to digital	analog to digital	analog to digital	analog to digital
Auxiliary Power to Controls?	yes	yes	yes	yes	yes
Control System Adequate?	ok	ok	ok	ok	ok
Vents Screened	18 vents	yes	3 vents	18 vents	
Overflow Screened			yes		
Access Hatches Locked	Yes	top of tank	No	Yes	via bldg access
Expansion Collar Lubricated	NA	no	NA	NA	NA
Deflection Plate	NA	no	NA	NA	NA
Overflow Splash Pad		no	yes	yes	yes
Site Fenced/Locked	yes	yes	yes	yes	yes
Operator Visit Frequency	3x/wk min.	3x/wk min.	3x/wk min.	3x/wk min.	3x/wk min.

Capacity

Usable Storage	57,000,000 gal		
Total Usable Storage	57,000,000 gal	57.000 mgd	
Total Usable Storage/Max Day	264%		
Total Usable Storage/Avg. Day	398%		

Comments:

Storage Facility Comments:

Dort Reservoir:
The Dort reservoir is filled via Control Station #3. The main to CS 3 tees off the 72-inch main upstream of CS 2. CS #5 controls flow from both sides of the Dort reservoir to the 3 MGAL Well. WTP staff drained and inspected the reservoir in 1992 and found it to be in good condition. All 18 U-shaped vent structures above the reservoir are inspected each fall by WTP staff. The Dort reservoir was re-inspected in 2008.

3 MGAL Reservoir:
WTP staff drained and inspected the reservoir in 1996 and found it to be in good condition. The reservoir is equipped with an internal overflow weir and drain at an elevation of 720 feet. The reservoir also has three 24-inch manhole vents. Repairs to the concrete base surrounding these vents have not been completed .

Cedar Street Reservoir:
This 20 MGAL reservoir is divided into two 10 MGAL cells. The east cell has ten 12-inch U-shaped vents along with six access hatches. The west cell has eight 24-inch manhole vents along with five access hatches. Security locks were provided for all access hatches. A security camera with an alarm is also provided.

WTP staff inspected the reservoir in 1997 and found it to be in good condition. Cracking and spalling of the concrete walls was minimal. There was a very small amount of sedimentation. The baffle walls were composed of ceramic block and were in good condition.

The winter operating range as Cedar Street is 1.5 feet which equates to 1.5 mgal. The summer operating range is increased to 3.0 feet or 3.0 mgal and pumpage is rotated with the West Side reservoir on a daily basis during the summer. The reservoir is re-filled during the night. WTP staff have indicated that thermal stratification is posing a problem at Cedar Street and a solar powered mixing system is being considered. A re-inspection of Cedar Street reservoir is planned in 2013.

West Side Reservoir:
The reservoir was inspected in 2012 and existing cracks were repaired with an NSF approved epoxy in the fall of 2012.

The winter operating range is 1.5 feet which equates to 1.05 mgal. The summer operating range is increased to 4.0 feet or 2.8 mgal. Pumpage is rotated with the Cedar Street reservoir on a daily basis during the summer. The reservoir is re-filled at night.

2 MGAL Elevated Tank:
Pressure downstream from CS #2 to the elevated tank is throttled such that the tank operates within the upper portion of its operating range. The tank was inspected in 2007 and the tank's interior and exterior were repainted in the summer of 2009. Repairs to the tank's roof hatch, vent, riser access hatch were also completed. The tank is inspected yearly by Utility Services. Control of Westside and the Cedar Street pump stations are set by the water level in the elevated tank. The setpoints are HWL at 33 ft and LWL at 20 ft.

The city has five storage reservoirs that provide a total storage volume of 57 million gallons. These facilities, based on our survey and previous inspection records, appear to be in good condition. Based upon the survey, we recommend the following for the storage reservoirs listed below:

3 MGAL Reservoir: Complete any remaining repairs needed on the concrete base around each of the vent manhole structures. Conduct an internal inspection.

Cedar Street Reservoir: Perform an inspection in 2013 and provide us with a copy of the inspection report.

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies? (Y/N)			Yes	
If yes, list WSSN number (s):			DWSD	1800
No. of Emergency Connections:				
Location	Main Size	Est. Capacity	Metered?	
C.S. 1	72"	>70 mgd	Yes	
Flint & GCDC conn. via Flint				
Donaldson St	12"	*	Yes	
Person & Clio	not conn	not used	Na	
Carpenter and Clio	12"	not used	Na	
Carpenter and Bray	12"	not used	Na	
Van Slyke Rd	24"	not used	Na	
Richfield	12"	not used	Na	
Woodrow and Center	8"	not used	Na	
East Atherton	12"	not used	Na	
Miller and Ballenger	8"	not used	Na	
Gen Co. Conn prior to Flint				
S. Genesee Pit	30"	13.2 mgd	Yes	
Vassar Rd	12"		Yes	
Irish Rd N	18"		Yes	
Irish Rd S	18"		Yes	
Belsay Rd	18"		Yes	
M-15 N	24"		Yes	
M-15 S	24"		Yes	
Oak Rd S	18"		Yes	
Oak Rd N	18"		Yes	
Henderson S	12"		Yes	
Henderson N	42"		Yes	
Center Rd. N	18"		Yes	
Branch Rd N	12"		Yes	
N Genesee Rd	12"		Yes	
Francis Rd	12"		2-way	

If emergency, are valves exercised annually? (Y/N) Recc.

Flushed? (Y/N) Recc.

Comments:
Out going meter pits from the city's west side.

* Water can exit Flint's distribution system to Genesee county at the Houran St. Pumping station (Donaldson St.) near Beecher Rd on the city's west side. This connection or alternate feed to Genesee County is no longer used since Genesee has completed their North Loop system and the Henderson Road pumping station.

Water can also exit Flint's distribution system at the Orgould Avenue pumping station; however, this facility is is not operational.

Emergency interconnection valves should be operated periodically to maintain ability to operate. Any dead-end piping should also be flushed prior to emergency use.

Distribution Piping

Mains by Material	
Cast Iron	70%
Ductile Iron	20%
PVC	0%
Asbestos-Cement	0%
HDPE	0%
Concrete	2%
Steel	8%

Mains by Size	
2"	0%
4"	3%
6"	51%
8"	24%
10"	0%
12"	8%
14"	to be det
16"	1%
18"	2%
24"	4%
30"-48"	1%

Mains by Age		
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	

Estimated percent of piping with coal tar lining 0%

Comments: The percent mains by material and size is based upon the 2011 Water Reliability Study.

The majority of Flint's distribution system consists of cast-iron and ductile iron piping up to 24" main sizes. The percentage of cast iron and ductile iron mains are not known at this time. The majority of the larger transmission mains (>24") consists of steel and concrete piping.

The city has replaced watermain since 2000, however, the overall shift in percentages has not been determined. Specific replacement projects are listed on Pages 3 and 4 of the review.

The city retained Rowe Incorporated to prepare a water system reliability study. Phases I and II of the study are completed and include a list of reccommended distribution system and transmission system improvements (Appendix B). Our review comments were provided to the city and Rowe in November of 2012 for the Phase II report. Rowe's response to our comments is pending.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? (Y/N) Many areas

If yes, identify locations:

west side transmission loop - 24-inch steel main
Fenton Rd
Atherton Rd
Dort Hwy
Averil St
Leslie
Gracelawn
Boulevard Drive

Comments: Main breaks also occur in many other areas of the city, however, the most frequent breaks occur in the areas listed above. The WSC has responded to approximately 760 watermain breaks from 2009 to date. WSC staff are utilizing City Point software in conjunction with GPS to track main breaks and as part of an asset management tool.

Are there areas where aesthetic water quality complaints are frequent? (Y/N) No

Comments: In general, water quality complaints are not received. Occasional complaints do occur from unanticipated flushing following street sweeping work and those associated with watermain repairs.

Do you receive complaints alleging illness due to the water? (Y/N) No

Is a procedure in place to respond to and track these complaints? Yes

Comments: All complaints are addressed by conducting additional water quality testing. Collection and analysis of samples are performed by WTP lab staff.

Are there areas where customers complain of low pressure? (Y/N) Yes

Comments: Some low pressure complaints have been received in the residential areas between MLK Blvd. and Welch and in the DuPont & Pasadena corridor.

Are there areas where peak flows (including fire flow) cannot be maintained? See Phase 2 of Reliability Study

Comments: The condition of the west transmission system limits fire protection. Phase II of the reliability study is expected to depict specific areas of the system not capable of providing adequate fire protection flow while maintaining the minimum 20 psi system pressure.

Last ISO rep 2008 Rating _____

Proposed distribution system improvements:

Phases I and II of the reliability study recommends a 6-year CIP for distribution system improvements. CIP consists of 2 pumping station projects, 5 major transmission system projects, and 6 minor transmission system projects. The Phase II study outlines other capital improvement projects that should be completed over the next 20 years.

MDEQ Conclusions/Recommendations

.t's water system consists of over 500 miles of distribution and transmission mains. Our main concern with Flint's water system continues to be the condition of the piping. Although the city has replaced approximately 12 miles of watermain over the past ten years, much of the remaining piping is over 60 years old and in need of replacement. Also, this rate of watermain replacement (1.2 miles per year - average) results in a total replacement rate of over 400 years. The typical water distribution replacement rate needs to be 100 years or less.

Next, the WSC has repaired over 750 watermain breaks from 2009 to date. Finally, the condition of the west transmission system limits the ability to provide adequate fire protection in the MLK Blvd, Welch, DuPont, and Pasadena corridor. This area has also noted for receiving low pressure complaints.

The city retained their consultant to update their water system reliability study and the first two phases of the study have been completed. The updated reliability study also arrives at the same conclusion that much of the system is in need of replacement. The Phase I study identifies major and minor transmission improvement projects and incorporates these projects into a 6-year capital improvement plan. The second phase of the study discusses Flint's 20-year needs and outlines potential capital improvements over the next 20 years. The second phase also outlines a hydrant replacement program. Finally, the second phase outlines the development of an asset management system.

The city needs to continue making water system improvements and include the projects listed in the 6-year capital improvement plan; however, the city must also develop an adequate water rate structure to ensure that these capital improvements are funded. An important objective in the second phase of the reliability study is the development of an asset management program that will play a key role in assisting the city to establish an adequate rate structure. The city needs to continue working with their consultant towards establishing an effective et management program and an on-going water system capital improvement program.

We are requesting that the city respond to us as to how they plan to correct the distribution system deficiencies. Critical steps need to include; identifying an adequate rate structure, developing a prioritized capital improvements plan, and a establishing a timeline by which these objectives and major projects are completed.

DISTRIBUTION

Pump Stations

Location: Cedar Street
Function: Provide supply from 20 MG Cedar St reservoir during peak demand

Pump Number	1	2	3
Year Installed	1948	1948	1948
Type	centrif	centrif	centrif
Permit Capacity			
Permit TDH			
Current Capacity	8 mgd	12 mgd	15 mgd
Basis	flow meter	flow meter	flow meter
Current TDH	160'	160'	160'
HP	500	350	350
Last Complete Inspection	All pumps receive maintenanc insp. annually - most recent 2/4/13		
Last Efficiency Test			
Control signal Type	Varies between analog and digital		
Controls Adequate?	ye	yes	yes
Operator Visit Frequency	daily	daily	daily

Auxiliary Power

Power Type	NONE		Power Rating (kWh)	
Fuel Type			Starting Freq.	
Total Pump Capacity	35	mgd	Load Test Freq.	
Firm Pump Capacity	20	mgd		
Auxiliary Power Capacity		mgd		

Max Day Demand @ this location		mgd
Peak Hour @ this location		gpm
Avg Day Demand @ this location	1	mgd
Firm Pump Capacity/Max Day		%
Peak Hour/Firm Pumping Capacity		%
Aux. Power Capacity/Avg Day		%

Comments:

The Cedar Street pumping station consists of three single stage horizontal centrifugal pumps that takes suction from an adjacent 20 mg reservoir. This station is used as a peaking facility and the reservoir is re-filled during low demand periods. Pump operation and filling of the reservoir is controlled at the WTP or manually at the booster station Pump operation set points are located within the distribution system.

Two of the existing cone valves were replaced with 14" pump control valves for pumps 2 and 3. Butterfly valves were also installed on the discharge side of all three pumps. Pump 1 is still controlled by the existing cone valve which still performs satisfactorily. Pump motors #1 and #2 were recently re-wound. The chlorine feed system has been removed from the pump station.

The average day demand through this station is determined by the amount of water taken from the storage reservoir. The station operates on a pump and fill cycle and alternates with the westside pump station on an every other day basis. This station is capable of metering total pumpage on a daily basis. The pump status is relayed via the SCADA system to the operations center. Daily pumpage is estimated and is recorded on the daily sheets.

The electrical controls and switchgear, late 40's vintage, remain outdated and most of the replacement parts are no longer available. A complete rehabilitation of the electrical system is proposed for the Cedar Street station and a construction permit has been issued for the project; however, the city has not proceeded with the work due to lack of adequate funding.

Pump maintenance consisting of lubrication and inspection is conducted once a month on all pumps at all of the booster pumping stations. Each pump is operated at least once a month. The pump station is well maintained and the housekeeping is above average. A detailed pump inspection including a pump efficiency test has not been performed within the past five years and is recommended. Chlorine monitoring is done at the suction header pipe.

Westside Pumping Station (P.S. No. 5)

Location: Westside
Function: Provide supply from an adjacent 12 mg reservoir during peak demand.

Pump Number	1	2	3	4
Year Installed	1970	1970	1970	1970
Type	turbine	turbine	turbine	turbine
Permit Capacity				
Permit TDH				
Current Capacity	4 mgd	4 mgd	8 mgd	8 mgd
Basis				
Current TDH	142'	142'	142'	142'
HP	100	100	200	200
Last Complete Inspection	All pumps receive maintenanc insp. annually - most recent 2/4/13			
Last Efficiency Test				
Control signal Type	Varies between analog and digital			
Controls Adequate?	yes	yes	yes	yes
Operator Visit Frequency	daily	daily	daily	daily

Auxiliary Power

Power Type	None	Power Rating (kWh)	
Type		Starting Freq.	
Total Pump Capacity	24 mgd	Load Test Freq.	
Firm Pump Capacity	16 mgd		
Auxiliary Power Capacity			

Max Day Demand @ this location		mgd
Peak Hour @ this location		mgd
Avg Day Demand @ this location	1	mgd
Firm Pump Capacity/Max Day		%
Peak Hour/Firm Pumping Capacity		%
Aux. Power Capacity/Avg Day		%

Comments:

The Westside pumping station consists of 2 three stage turbine pumps and 2 two stage turbine pumps that take suction from an adjacent 12 mg reservoir. The station serves as a peaking facility and the reservoir is re-filled during low demand periods during the winter months. During the summer months the station operates on a continuous pump and fill cycle and the operation alternates every other day with the Cedar Street station. Pump operation and filling of the reservoir is controlled at the WTP or manually at the booster station. Pump operation set points are located within the distribution system. The reservoir typically operates between 13 and 16 feet of water elevation.

Daily pumpage is recorded on the daily operations sheet; the Westside station is not metered; however the calculation of the number of feet dropped in each reservoir is performed daily at 12am and used to determine pumpage at Westside. Chlorine monitoring is performed at the suction well.

Modifications to the pump-discharge valving is needed. The existing 4 mgd pumps are equipped with spring check valves. T' 's design causes rapid valve operation during pump start-up and bumps the distribution piping downstream and most .y contributes to the main breaks in this area. The larger pumps are equipped with cone control valves. Although these are currently working, they had a history of operational problems at the pump station.

WSC staff are installing an air-shock pressure bladder on the booster station's main discharge line as a means to address main breaks in this area. A chlorine residual monitoring point is also being added to monitor the chlorine residual in the reservoir.

The chlorine feed system has been removed from the pump station.

Pumping Station No. 4 (P.S. No. 4)

Location: P. S. #4
Function: Provide supply from 20 mg reservoir and 3 mg well during peak demand.

Pump Number	1	2	7	8	9
Year Installed	1949	1949	1994	1994	1994
Type	turbine	turbine	turbine	turbine	centrif
Permit Capacity					
Permit TDH					
Current Capacity	20 mgd	25 mgd	20 mgd	20 mgd	6 mgd
Basis	flow meter	flow meter	flow meter	flow meter	flow meter
Current TDH	185'	185'	185'	185'	185'
HP	800	1000	800	800	
Last Complete Inspection	All pumps receive maintenanc insp. annually - most recent 2/4/13				
Last Efficiency Test					
Control signal Type					
Controls Adequate?					
Operator Visit Frequency	daily	daily	daily	daily	daily

Auxiliary Power

Power Type	none - dual electrical feeds to WTP	Power Rating (kWh)	
Fuel Type		Starting Freq.	
Firm Pump Capacity	mgd	Load Test Freq.	
Firm Pump Capacity	mgd		
Auxiliary Power Capacity	mgd		

Max Day Demand @ this location _____ mgd
Peak Hour @ this location _____ mgd
Avg Day Demand @ this location _____ mgd

Firm Pump Capacity/Max Day _____ %
Peak Hour/Firm Pumping Capacity _____ %
Aux. Power Capacity/Avg Day _____ %

Comments:

Pumps 7,8, and 9 are in good operating condition. Pump #9's main purpose is to recirculate water in the 3 Mgal well. Pumps #1 and #2 remain in-operable; thus the total and firm pumping capacity of the station remains at 46 and 26 MGD respectively. WTP staff are discussing with the city the possibility of replacing Pumps #1 and #2 with new pumps of lower capacity.

Chlorine monitoring is collected from a sample tap representive of water from the middle of the 3MGAL well.

Pump Station #4 was also rehabilitated in 1994. The project consisted of two 20 mgd pumps and one 6 mgd pump t[illegible]mprove turn over in the 20 mg Dort reservoir. The project also included installation of a second 42" discharge line.

A stand-by power generator exists but is not capable of providing sufficient power. Dual electrical feeds are provided provided for the WTP site and include P.S. #4; however, the dual feeds emminate from one main electrical grid.

Torrey Road Pumping Station

Location: Torrey Road
Function: Boost pressure to the SW portion of the city including Hospital Hill

Pump Number	1	2	
Year Installed	1954	1954	
Type	centrif	centrif	
Permit Capacity			
Permit TDH			
Current Capacity	2.8 mgd	4 mgd	
Basis			
Current TDH	65'	100'	
HP	40	125	
Last Complete Inspection	All pumps receive maintenanc insp. annually - most recent 2/4/13		
Last Efficiency Test			
Control signal Type			
Controls Adequate?			
Operator Visit Frequency		1/day	

Auxiliary Power

Power Type	None	Power Rating (kWh)	
Fuel Type		Starting Freq.	
Total Pump Capacity		Load Test Freq.	
Pump Capacity			
Auxiliary Power Capacity			

Max Day Demand @ this location		mgd
Peak Hour @ this location		mgd
Avg Day Demand @ this location		mgd
Firm Pump Capacity/Max Day		mgd
Peak Hour/Firm Pumping Capacity		mgd
Aux. Power Capacity/Avg Day		mgd

Comments:
The Torrey Road station functions an in-line booster pump station and takes suction form a 24" trans. main along Hammerberg Rd. This station boosts pressures in the SW portion of the city; however, the extent of the pressure district is not clear. The station operation is controlled by a pressure monitor located at Brown & Bradley Street and is transmitted back to the pump station and the operations center at the WTP. Operation of the station is controlled manually from the WTP. The station is operated when the line pressure at Brown & Bradley drops below 45 psi - usually at night when the Cedar Street and/or Westside Reservoirs are re-filling. Pump #2 is not used due to its high discharge head. A new, smaller pump or a variable frequency drive is needed at this facility for more reliable and efficient operation.

Improvements to the pump station are planned for 2013 and a construction permit has been issued for the work. The project will include replacement of both pumps, new piping and valving, and provisions for stand-by power.

TCEQ Conclusions/Recommendations:

All of the pumping stations are well maintained and the housekeeping is above average; however, pump availability, valving and electrical controls, switchgear, and stand-by power are pump station deficiencies that need to be corrected. Although the city has attempted to finance improvements at the Cedar Street and Torrey Road stations with Drinking Water Revolving Funds (DWRF) and a construction permit was issued, these projects did not proceed due to the city's current bond debt.

While we understand the financial constraints that the city is encountering to secure financing for these projects; however, the condition of the Cedar Street and Torrey Road station and their limited operating reliability will remain a concern until they are corrected. The need to replace Cedar Street's station's outdated electrical switchgear and provide stand-by power has been a long-standing issue. Next, the Torrey Road pump station has only one reliable pump for operation and this facility plays an important role in providing adequate water service to the western portion of the city including the Hospital Hill area. Stand-by power is also needed at the Torrey Road pump station.

It is our understanding that the city will proceed with an upgrade of the Torrey Road station in 2013 including replacement of the oversized pump, variable frequency drive control, new piping and valving, and provisions for stand-by power. It is also our understanding that adequate funds are in place to complete the improvements at Torrey Road. The city needs to proceed with and complete the work needed at this station.

Finally, we are requesting the city, by no later than June 1, 2013, to propose a timeframe by which the electrical improvements and standby-power provisions can be completed at the Cedar Street station.

DISTRIBUTION

Hydrants

Number of Hydrants	3909
Number Without Auxiliary Shut-Off Valves	not aware of any
Number that are Self-Draining	>90%
Number of Inoperable Hydrants	18 **

Frequency of Hydrant inspection: 1/yr (fall)

Inspection Staff: L18 Maintainers L19 Equip. Ops. Dist. Foreman

Comments: All replacement hydrants are ordered plugged, however, a few are unplugged.
** The number of inoperable hydrants is always changing. Hydrants that are found in a state of disrepair are usually repaired within one week.

WDD operators have replaced a significant number of deficient hydrants over the past several years, including thirty 4-inch hydrants in 2012.

Are there areas where additional hydrants are needed? some areas

The WDD would like to establish a 300-500' hydrant spacing standard.

Hydrant location system Yes Accurate? yes

Records depicting hydrant blueprints and cards are in place and appear to be accurate.

re hydrants color coded for capacity? yes, but not consistent

Hydrant caps are coded by main size; however, this coding system is not consistent. Hydrants also need to be re-painted.

Has this information been provided to the fire department? Improved communication needed

Frequency and seasons of hydrant flushing 1/yr (fall)

Hydrants are flushed once a year during the fall. Flushing is performed to maintain water quality and to maintain hydrants. WDD targets dead-end watermains for flushing during the summer months.

Purpose of flushing aesthetics

Is the public notified prior to flushing? Yes - via local news

Does flushing follow a specific format? yes

Flushing is set-up on a per grid basis with 50-100 hydrants per grid. Usually one operator is assigned to a grid. There is no order in which the grids are flushed. Directional flushing is not conducted due to limited staffing and need to operate isolation valves in order to directionally flush. Hydrants are flushed full and until they run clear. As water usage continues to decline, more frequent flushing may be needed to maintain asethetic water quality.

Is the volume of water used during flushing estimated? No

Is a record maintained of hydrant activities? Yes

ydrant records and work orders are maintained and the WDD has established an accurate hydrant database.

All hydrants are included on individual water system maps and they are entered on a database system that prints maps as needed. Specific information about each hydrant is also contained. Hydrant cards and work orders are also maintained and this information is updated in the database system.

The fire department is informed about inoperable hydrants and updates on the status of these hydrants has improved. The WDD also needs to inform the fire department regarding which hydrants are difficult to operate yet functional. The fire department may conclude that many of these hydrants are totally in-operable. The WDD needs to continue to maintain good communication with the fire departments on hydrant status and to refresh proper hydrant operation.

The WSC allows contactors to use system hydrants provided that they rent a hydrant meter and backflow preventer device from the WSC. WSC staff also set the meter and backflow preventer device to insure proper operation. The WSC is looking to installing a filling station at the WSC to make purchasing of water by contractors more convenient.

MDEQ Conclusions/Recommendations

The WDD is maintaining an adequate hydrant program; however, it appears that some improvement in communication between the WDD and the fire department concerning color coding and the condition of hydrants are needed. It is also important to verify that fire department staff are familiar with the procedures of opening and closing hydrants. Finally, the WDD should work at estimating the volume of water being used during flushing. This will help to determine the component of unaccounted water due to flushing.

DISTRIBUTION

Valves

Number of Valves: 7,258 2011 Reliability Study

Number of inoperable valves: many

Are there areas where additional valves are needed? yes

If yes, list locations:
Along Saginaw St and many other areas
The WDD indicated that many of the city's valves do not work and has resulted in larger than necessary interruptions in water service to make the necessary repairs.

Valve location system: partial system Accurate? yes

Valve Turning Frequencies: no program in place

Comments:
The reason given for the continued lack of a valve turning program is an insufficient number of operators to perform the work and insufficient equipment. Operators have a GPS controlled valve turning machine; however, a reliable vehicle is needed to transport the machine.

Records Maintained? approx. 70% adequate records of distribution system valves.

The city has received community block grant funds over the past several years to be utilized for hydrant and valve replacement . Approximately $100,000 was received in 2012 which allowed for replacement of approximately 30 hydrants. The city anticipates receiving $140,000 in CBG funds in 2013 and the funds will be used for valve replacement.

MDEQ Conclusions/Recommendations

The city's valve program has improved; however, deficiencies still need to be resolved. Although accurate valve records have been established for nearly 70% of the valves, a turning program needs to be implemented. The WDD; however, needs to acquire a more reliable vehicle to transport their valve turning machine in order to implement valve turning. Phase II of the reliability study provides a good strategy towards implementing an effective valve turning program. Although it would not be possible to turn all system valves on a yearly basis, an exercising schedule should be established especially for valves in critical locations. The city should strive at turning a certain percentage of valves each year such that all valves are turned over a five to ten year time period. The city needs to implement these strategies and eliminate the barriers that are inhibiting the WDD from establishing an effective valve program.

DISTRIBUTION

Customer Service Information

Number of service connections	app. 32,900
Number of metered service connections	31,228 residential
	1,671 commercial
Identify service line materials and estimate percentages:	
Copper	10%
PVC/PE/PB	none
Galvanized	10%
Lead	80%
	(CWS/Customer)
Ownership of Service	
From Corp Stop to Curb Stop	City
From Curb Stop to Property Line	Customer
From Property Line to Meter	Customer
Meter	City

Customer Meters

Types of meters Used	Metron & Badgers
Number of Meters with Touch Pads or Other Remote Reading Devices	99%
Size of Meters	Varies
Residential	5/8 -in to 4-in
Industrial/Commercial	5/8-in to 8-in
Meter Testing/Maintenance Program	limited
Average Age of Meter is System	Res. - 7 yrs
Residential/Commercial/Industrial	4 yrs
Criteria for Changeout	failed - cust pays
Number or Percent Changeout per Year	approx. 300
Master Meter Locations	eleven
Calibration of Master Meters	Genesee County
Meter Reading Staff/Contract:	WDD Staff

Comments:

The WDD has a large percentage of Badger meters with transponders that are expected to fail soon and will need to be replaced. These meters are replaced on an as-needed basis and are cooridinated in conjunction with other work needed at the given location. The city keeps track of all active accounts including the number of second meters serving multiple housing units and/or irrigation meters as well as non active accounts including water shut offs.

Pumpage Distribution

% Residential	24.00%	
% Lg. Commercial & Indust.	76.00%	
% Lg. Users - List	7.00%	GM Truck
	< 1%	Delphia
	1.00%	Hurley Med. Ctr.

DISTRIBUTION

System Growth

Year	No. of Residential Meters Installed	No. of Comm./Industrial Meters Installed	No. of Construction Permits Issued	Permitted Amount of WM Feet
2002				
2003	none	none		
2004	none	none	2	WM Repl
2005	none	none	2	WM Repl
2006	none	none	2	WM Repl
2007	none	none	4	WM Repl
2008	none	none	2	WM Repl
2009	none	none	2	WM Repl
2010	none	none	2	WM Repl
2011	none	none	1	WM Repl
2012	none	none	2	WM Repl

Water Rates

What is your current rate schedule?	see comment
Are current rates adequate to support O&M and CIPS?	see comment
When was last time rates were adjusted?	2012
Has a water rate study been performed? When?	Being conducted with Genesee County
Is there a meter charge or ready to serve charge?	Yes - based on size
Is a copy of the water rate schedule and ordinance available?	Yes

Comments:
Water rates are $7.52/100 CF for the first 3,500 CF, $7.31/100 CF for the next 196,500 CF, and $5.79/100 CF for any usage above 200,000 CF. In addition to the consumption rate, the remote and non-remote meter monthly charge is $21.78 and $26.33 respectively. A copy of Flint's water rate schedule is in Appendix C.

Since 2000 there has been a steady decline of residential, commercial, and industrial customers. Although the city acquired a few new customers, the city's population has declined by over 20,000 between 2000 and 2010. Construction permits issued in Flint have been for watermain replacement projects as opposed to serve new development. Specific projects are summarized in the Construction Permits section.

MDEQ Conclusions/Recommendations

The city of Flint is required to provide adequate Financial Capacity and demonstrate this capacity to the MDEQ. Flint's water rate schedule and method of collection must be adequate to allow for water system capital improvements and to maintain important water system operation and maintenance programs. Current lack of Financial Capacity is evident based on the deficiencies in various water system O&M programs attributed to the lack of funding to provide proper equipment and/or sufficient staffing to maintain program objectives. As we discussed, Flint needs to proceed with an asset management program as recommended in the second phase of the 2011 Reliability Study. Completion of asset management will help the city to determine an adequate rate structure and collection methodology to support both an active O&M and CIP programs.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	Avail up to 48-inch
Repair Clamps (2 or more for each size)	Yes
Tees, Crosses & Elbows	Yes
Hydrants	Yes
Valves	Yes
Services (Corp & Curb Stops, Clamps and Lines)	Yes
Other	see comment

Safety Issues

Confined Space Entry Program in Place % Followed (Y/N)	Yes
Trench Safety Program in Place & Followed (Y/N)	Yes

Comments:
The WSC must purchase their spart parts from local vendors who provide the inventory in the WSC's stock-room. WSC staff have 24-hour access to repair parts and parts are purchased from the stockroom with a city issued credit card. The purchasing process has improved somewhat; however, is still somewhat cumbersome.

PROGRAM COMPLIANCE

Cross Connection Control Program (CCCP)

Ordinance No.	3712 Sec. 46-34 & 46-35	Date:	6/12/2008
Approved Program (Y/N)?	Yes	Date:	
Staff Assigned to Program, (No., Dept. and/or who)		Utilities Cross Connections Division (UCCD)	
Is Annual Cross Connection report required (Y/N)?		Yes	
Was previous year's annual report received (Y/N)?		Yes	Date Received: 2/29/2012
Was previous year's annual report acceptable (Y/N)?		Yes	
Inspection Status:	Acceptable implementation		
Assembly Testing Frequency	1-2x/yr. (high hazard) 1x/yr. (mod. and low had)		
Assembly Testing Perform.			
Recordkeeping:	Database program		

Private Well Isolation/Abandonment Procedure:

Comments:

The UCCD has maintained adequate implementation of the CCCP. Mr. Glen Thomas continues to conduct cross connection inspections at all (approx. 300) of the high hazard accounts each year. There has been an overall reduction in the number of eligible cross connection accounts due to the city's shrinking customer base. The loss of Delphi East and West and the Buick City site has contributed to the shrinking number of accounts eligible for routine cross connection inspections. As of 2011 there were approximately 2,000 low hazard accounts and approximately 600 of these accounts are inspected each year. Low hazard accounts are scheduled to be inspected once every three to five years. RPZ device testing is also performed and approximately 75% of the 1,200 testable devices are tested on a yearly basis. Based upon the survey, the city is meeing the 1-year and 3-year objective for device testing.

Recordkeeping is adequate and consists of a database that lists each account by their degree of hazard.

MDEQ Conclusions/Recommendations

The city is maintaining adequate implementation of their CCCP and are completing a sufficient number of low and high hazard inspections each year. It appears that additional clerical assistance is needed is needed for recordkeeping, reporting, and maintaining the CCCP inspection schedules. We encourage the city to review the CCCP's workload to further determine the need for additional assistance.

Finally, although an acceptable CCCP is being maintained for the commercial and industrial customers, the city will need to expand their CCCP to include inspections of residential accounts. Part 14 of Act 399 prohibits cross connections and requires public utilities to have a formal program in place to control them. There is no differentiation in the rules between residential and other customer types. A guidance document was provided to Mr. Thomas on how to implement this important program on the residential level. We ask that this document is reviewed and utilized towards developing a strategy to implement residential cross connection control. We will also discuss expansion of the CCCP to include residential customers during future water system inspections.

Annual Pumpage Reports

Is Annual Pumpage Report required (Y/N)?	No
Was previous year's report received (Y/N)?	yes

Monthly Operator Reports (MORs)

Are Monthly Operation Reports required (Y/N)?	Yes		
Were all previous year's reports received (Y/N)?	Yes	Timely?	Yes
Are previous year's reports acceptable (Y/N)?	Yes		

MDEQ Conclusions/Recommendations

The WTP staff are responsible for preparing the MORs and the routine MOR is acceptable. WTP staff also prepare an operation report for each routine test run and emergency operation. The test run reports include all of the critical treatment plant operating parameters; however, the emergency operation reports needs to include the average, maximum, and minimum values for these treatment parameters.

Consumer Confidence Reports

Is the annual CCR requires? (Y/N)	Yes				
Was the previous year's report received? (Y/N)	Yes	Timely?	yes		
Was the previous year's acceptable? (Y/N)	Yes				
Was the previous year's certification form received? (Y/N)	yes	Timely?	yes		

Comments: A copy of Flint's most recent CCR and water quality data can be found in appendix D .

PROGRAM COMPLIANCE

Emergency Response Plan (ERP)

Date of Most Recent Plan:	2013	Acceptable?	see comments
Filed where?	WTP		

MDEQ Conclusions/Recommendations

WTP staff have prepared a water system ERP (draft). The draft ERP discusses the 72-inch pipeline emergency and coordination with Genesee County. Much has been learned in the past five years with regards to emergencies on the pipeline and emergency operation of the stand-by water treatment plant (WTP). The loss of service on the basis of a total shut-down (both Flint and Genesee County being impacted) includes the provision to provide Genesee County with 8.0 MGD of treated Flint River water by back-feeding the 72-inch transmission main.

Other required information including; contacts, critical customers, communications, contractors, and suppliers are provided.

The ERP needs to updated further to discuss the various plans and agreements (type and location) that are in place to help mitigate water related emergencies. This includes; water system general plan, safety plans, water quality monitoring plans, and mutual aid agreements. All master meter locations and emergency interconnections also need to be listed in the ERP.

Finally, the ERP includes a discussion of emergency chlorination procedures for contamination of water storage reservoirs and distribution system piping. The procedure references the use of swimming pool chlorine to be used for disinfection. The use of swimming pool chlorine cannot be used for water system disinfection unless the compound is an ANSI/NSF Standard 60 approved product. The ERP needs to be revised to confirm that

General Plan

Date of Most Recent Plan:	1991	Acceptable?	See comments
Filed Where?	Water Service Center		

General Layout	needs updating
Facilities locations & capacities	yes
Watermain Inventories	yes
Id of Service Areas	yes
Hydraulic Analysis	yes
CIP	yes

Comments:
The most recent general plan containing distribution system info was prepared in 1991 and is outdated. The WSC also has a series of more detailed maps (120 smaller maps) of the distribution system. Finally, the city has a hydraulic network model of the transmission piping that was prepared as part of the reliability study. Although, this model will be useful for modeling the water system for future extensions and/or water system studies, the general plan needs to be updated.

Reliability Study

Date of Most Recent Study:	2010 -2012	Acceptable?	Phase I - yes Phase II - MDEQ comments provided
Filed Where?	City, MDEQ		

5 & 20 Year Demand Projections	yes
Source Prod. Totals (Monthly)	yes
Customer Supply Usage (Annual)	yes
Res/Comm/Ind Usage (Annual)	yes
Water Shortage Response Plan	no
Recommended Improvements	yes

Comments:
The city retained Rowe Incorporated to perform a water system reliability study. Phase I was completed in 2010 and included an updated hydraulic model of the distribution system along with the establishment of a 6-year capital improvements program. Phase II (draft) was available late in 2012 and focused on the 20-year capital improvements program and included distribution, transmission, and pumping station improvements. Development of necessary rate structures to operate and maintain the water system and a preliminary asset management plan were also included with the Phase II study. The MDEQ provided comments to the Phase II study.

MDEQ Conclusions/Recommendations

Our comments/questions to the second phase of the reliability need to be answered such that the reliability study can be approved. As part of the approved study, the city's 1991 water system general plan needs to be updated and a working copy be made available for WSC and WTP staff.

Next, the city will need to complete the projects in the 6-year CIP, maintain an on-going CIP by 2016 and beyond, and establish an asset management program. We will discuss the 2016 requirements for the CIP and asset management program in more detail in future during future site visits.

Permits

Applies for and obtains permits prior to construction (Y/N):	Yes
Reviews plans from engineers and/or developers prior to submittal to DEQ (Y/N):	Yes
Standard specifications on file at CWS (Y/N):	Yes
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):	NA
Follows master plan for any construction (Y/N):	NA - no current master plan
Actually follows plans as permitted (Y/N):	Yes
Develops as-built plans (Y/N):	Yes
Updates general plans (Y/N):	No

MONITORING

Bacteriological

ate of Approved Site Sampling Plan :	Dec. 2012
e samples still being collected in accordance with the plan? (Y/N)	Yes
Number of samples required each month:	100
Basis for Setting Number of Monthly Samples:	Population
Certified Lab Used:	Flint WTP Lab
MCL, Monitoring or Reporting Violation(s) in past 3 years?	No
Number & Type of Violations	None
Public Notice Issued according to regulations? (Y/N)	NA

Comments: The city continues to update the sample site plan due to constant changes in their routine sampling locations. A revised plan is sent to us following any changes. Distribution system chlorine residuals are taken during routine bacteriological sampling. A monthly and yearly average for free and total chlorine residual is maintained. Chlorine monitoring is also conducted at each pump station.

Chemical - DWSD purchased water; thus much of the monitoring is not required

Date of Monitoring Schedule:	2/17/2013	
Are samples still being collected in accordance with the schedule? (Y/N)	Yes	
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)		NA
If nitrate detect, what is concentration?		
If nitrite detect, what is concentration?		
Detects for metals > 50% of MCL? (Y/N)	NA	
Metals (list)		
Detects for VOCs (Y/N)	NA	
Detects for SOCs (Y/N)	NA	
Date of Approved Stage II Disinfection Byproduct Monitoring Plan :	4/24/2012	
Stage II DBP Sampling Done? (Y/N/Waived)	Yes	
If yes, done to site sampling plan? (Y/N)	Yes	

Lead and Copper Monitoring

No. of Samples Required:	23	
Semi Annual/Annual/Triennial	Triennial	
Exceedance of lead or copper action level (Y/N)	No	
If yes, was public education issued (Y/N)	na	Date Issued:
Next Monitoring Period:	6/1/2014 - 9/30/2014	
Corrosion Control Program, if applicable	NA	
Lead service line replacement status, if applicable	NA	

Comments:
The city has adequately implemented their lead and copper monitoring program. The city participates in the modified consecutive system plan with Detroit which allows for a reduction from the full chart value of 100 sampling points to 23 points once per monitoring period.

Radiological Monitoring - Not required since Flint purchases water from Detroit

Distribution System Sanitary Survey Summary

1. Designate a distribution system back-up operator holding an S-4 (or higher) certification - Page 2

2. Perform an inspection of the 3 Mgal Well and, if needed, complete repairs on concrete base around each manhole vent - Page 7

3. Complete an inspection of the Cedar Street reservoir and provide us with a copy of the inspection report - Page 7

4. Establish a schedule for completing the 6-year capital improvements program that is presented in the reliability study - Page 4.

5. Proceed with and complete the improvements needed at the Torrey Road pump station - Page 16

6. Propose a schedule for completing the electrical improvements/stand-by power provisions at the Cedar Street pump station - Page 16

7. Maintain adequate communication between the Water Distribution Division and the fire department concerning the condition of hydrants and the color coding system - Page 18

8. Begin estimating the volume of water used for flushing - Page 18

9. Correct valve program deficiencies - purchase necessary equipment, acquire/train additional operators, and implement a valve maintenance program - Page 19

10. Review the Cross Connection Control Program workload and, as needed, provide additional program assistance - Page 22

11. Expand the scope of the WTP test run reports to include the average, maximum, and minimum values for the reported treatment parameters - Page 22

12. Update the draft Emergency Response Plan (ERP) to address our comments. Remove wording from the draft ERP that calls for use of pool chlorine for water system disinfection during emergencies - Page 23

13. Prepare a final copy of the water system Reliability Study - Phase II which addresses our review comments - Page 24

14. Update the 1991 water system general plan - Page 24.

APPENDIX A

WSC Organizational Chart

APPENDIX B

Recommended 6-year CIP

Table 1: 6-Year Capital Improvement Table

Project Number	Capital Improvement Program	Design Status	Construction Status	2010 Construction Costs	Contingencies, Engineering, Management and Legal (CEM&L @ 47%)	Total CIP Project Cost
	Major Booster Station Improvement Projects					
Project 1	Torrey Road Booster Upgrades (In-house)	Design Complete	Construct 2010	$300,000	$141,000	$441,000
Project 2	Water Pumping Station 3 Electrical and Controls Upgrade	Design in progress	Construct 2010	$900,000	$423,000	$1,323,000
	Sub Total			**$1,200,000**	**$564,000**	**$1,764,000**
Project 3	**Major Transmission System Improvement Projects**					
Project 4	28,000 LFT of 24" & 30" watermain, WTP to Dupont; South to University	Design Complete	Construct 2011	$10,000,000	$4,700,000	$14,700,000
Project 5	Water Meter Replacement Program 3,000 meters/year		2010-2015	$1,000,000		$5,000,000
Project 6	15,500 LFT of 12" & 24" watermain; Saginaw St, Flint River to Pierson Rd	2010	2012	$3,800,000	$1,786,000	$5,586,000
Project 7	16,100 LFT of 16" watermain; Atherton Rd, Van Slyke to Dort	2010	2013	$4,000,000	$1,880,000	$5,880,000
	Sub Total			**$18,800,000**	**$8,366,000**	**$31,166,000**
	Minor Transmission System Improvement Projects					
Project 8	500 LFT of 6" watermain; Hamilton Ave, Mason St to MLK Blvd.	2010	2011	$50,000	$23,500	$73,500
Project 9	1,650, LFT of 6" watermain; Sonny Ave, Dupont to Lawndale	2010	2011	$165,000	$77,550	$242,550
Project 10	1500 LFT of 6" watermain; Walton St, Clairmont to Augusta	2010	2012	$150,000	$70,500	$220,500
Project 11	1500 LFT of 6" watermain; East Blvd, Farmers Market to Park	2011	2013	$150,000	$70,500	$220,500
Project 12	325 LFT of 6" watermain; Alexander St, Taylor to Rankin	2011	2014	$32,500	$15,275	$47,775
Project 13	1075 LFT of 6" watermain; Mack St, Clio Rd to Winona	2011	2015	$122,500	$57,575	$180,075
	Sub Total			**$670,000**	**$314,900**	**$984,900**
	Total CIP Costs			**$20,670,000**	**$9,244,900**	**$33,914,900**

APPENDIX C

Water Rate Schedule

effective 7/1/12

5 to 5
$40 = 45/MO
For AVG
Homeowner

SCHEDULE OF WATER RATES & CHARGES
EFFECTIVE FOR BILLS DUE AFTER 7/1, 2012

WATER CONSUMPTION RATES

Metered Water

Rates per 100 cubic feet (ccf)	Rates Effective September 16, 2011 Inside City Rate	Outside City Rate	Rates For Bills Due After 7/1, 2012 Inside City Rate	Outside City Rate
Through 35 ccf	6.683	10.008	7.518	11.259
Next 1,965 ccf	6.498	9.569	7.310	10.765
Over 2,000 ccf	5.148	7.713	5.792	8.677

WATER MONTHLY SERVICE CHARGES

Remote Meter Monthly Charge

Meter Size	Rates Effective September 16, 2011 Inside City Charge	Outside City Charge	Rates For Bills Due After _____, 2012 Inside City Charge	Outside City Charge
5/8"	19.356	28.874	21.776	32.483
3/4"	37.210	55.739	41.861	62.706
1"	49.140	73.593	55.283	82.792
1-1/2"	49.140	73.593	55.283	82.792
2"	49.140	73.593	55.283	82.792

Non-Remote Meter Monthly Charge

Meter Size	Rates Effective September 16, 2011 Inside City Charge	Outside City Charge	Rates For Bills Due After _____, 2012 Inside City Charge	Outside City Charge
5/8"	23.406	35.269	26.332	39.678
3/4"	41.479	62.201	46.664	69.976
1"	53.291	80.055	59.952	90.062
1-1/2"	53.291	80.055	59.952	90.062
2"	53.291	80.055	59.952	90.062

Commercial & Industrial Monthly Charge

Meter Size	Rates Effective September 16, 2011 Inside City Charge	Outside City Charge	Rates For Bills Due After _____, 2012 Inside City Charge	Outside City Charge
5/8"	47.453	71.230	53.385	80.134
3/4"	54.456	81.524	61.263	91.715
1"	66.758	100.154	75.103	112.673
1-1/2"	95.783	143.809	107.756	161.785
2"	133.886	200.965	150.622	226.086
3"	264.398	398.639	297.448	448.469
4"	465.329	698.103	523.495	785.366
6"	915.048	1,372.326	1,029.429	1,543.867
8"	1,327.000	1,990.643	1,492.875	2,239.473
10"	1,831.781	2,762.201	2,060.754	3,107.476
12"	2,216.110	3,324.004	2,493.124	3,739.505
16"	2,757.899	4,136.771	3,102.636	4,653.867
20"	2,978.829	4,856.726	3,351.183	5,463.817

APPENDIX D

Consumer Confidence Report

000521

2310

CUSTOMER SERVICE CENTER
CITY HALL
1101 S. SAGINAW ST.
FLINT, MI 48501

PRSRT STD
U.S. POSTAGE
PAID
FLINT, MI
Permit No. 6

DEQ
RESOURCE MANAGEMENT DIVISION
SEP 10 2012
LANSING DISTRICT

Department of Utilities
FLINT

City of Flint
Water Plant & Facilities

2011 Consumers Annual Report on Water Quality

The City of Flint Department of Utilities is dedicated to providing a high quality drinking water to the residents of the community. The Consumers Annual Report on Water Quality provides important information about your drinking water. This report includes information about the source of the water, health information, a chart summarizing United States Environmental Protection Agency (USEPA) required testing results, and a table giving explanations of important terms to understand when viewing the test results. The Flint Water Plant & Facilities maintains total 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 at the City of Flint web page on the Internet at *www.cityofflint.com* or by calling the Flint Water Plant & Facilities 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 be found on the USEPA web site at www.epa.gov/safewater/.

Water Source

The City of Flint purchases drinking water from the Detroit Water & Sewerage Department (DWSD) which operates several drinking water facilities. Following treatment to remove impurities, the water is pumped by DWSD to the Flint Water Plant, where the water is then monitored and distributed throughout the City

The source water comes fr[redacted]e lower Lake Huron watershed. The w[redacted]shed includes numerous short, seasonal streams that drain to Lak[redacted]uron. The Michigan Department of En[redacted]onmental Quality in partnership with the U.S. Geological Survey, the Detroit Water & Sewerage Department, and the Michigan Public Health Institute performed a source water assessment in 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Lake Huron source water intake is categorized as having a moderately low susceptibility to potential contaminant sources. The Lake Huron water treatment plant has historically provided satisfactory treatment of this source water to meet drinking water standards. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810) 787-6537.

General Information

To ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants;** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants;** such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming. **Pesticides and herbicides;** which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants;** including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants;** which can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

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 Department of Utilities 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 your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 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.

000523

Lake Huron Water Treatment Plant

2011 Regulated Detected Contaminants Tables

Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest Level Detected	Range of Detection	Violation yes/no	Major Sources in Drinking Water
Inorganic Chemicals – Annual Monitoring at Plant Finished Water Tap								
Fluoride	08/14/2011	ppm	4	4	0.98	n/a	No	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	08/14/2011	ppm	10	10	0.30	n/a	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Barium	6/9/2008	ppm	2	2	0.01	n/a	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Disinfectant Residuals and Disinfection By-Products – Monitoring in Distribution System								
Total Trihalomethanes (TTHM)	Feb-Nov 2011	ppb	n/a	80	36.0	11.0 - 36.0	No	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	Feb- Nov 2011	ppb	n/a	60	14.0	6.0 - 14.0	No	By-product of drinking water disinfection
Disinfectant (Total Chlorine Residual)	Jan-Dec 2011	ppm	MRDGL 4	MRDL 4	1.10	0.30 – 1.10	No	Water additive used to control microbes

2011 Turbidity – Monitored every 4 hours at Plant Finished Water Tap			
Highest Single Measurement Cannot exceed 1 NTU	**Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)**	**Violation yes/no**	**Major Sources in Drinking Water**
0.2 NTU	100%	No	Soil Runoff
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.			

2011 Microbiological Contaminants – Monthly Monitoring in Distribution System					
Contaminant	**MCLG**	**MCL**	**Highest Number Detected**	**Violation yes/no**	**Major Sources in Drinking Water**
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	0	No	Naturally present in the environment.
E.coli or fecal coliform bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	0	No	Human waste and animal fecal waste.

2011 Lead and Copper Monitoring at Customers' Tap								
Contaminant	**Test Date**	**Units**	**Health Goal MCLG**	**Action Level AL**	**90th Percentile Value***	**Number of Samples Over AL**	**Violation yes/no**	**Major Sources in Drinking Water**
Lead	2011	ppb	0	15	< 2.0	0	No	Corrosion of household plumbing system; Erosion of natural deposits.
Copper	2011	ppm	1.3	1.3	0.102	0	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives.
*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below the given 90th percentile value. If the 90th percentile value is above the AL additional requirements must be met.								

Regulated Contaminant	Treatment Technique	Running annual average	Monthly Ratio Range	Violation Yes/No	Typical Source of Conataminant
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio between the actual TOC removal and the TOC removal requirements. The TOC was measured each month and because the level was low, there is no requirement for TOC removal.				Erosion of natural deposits

2011 Special Monitoring

Contaminant	MCLG	MCL	Level Detected	Source of Contamination
Sodium (ppm)	n/a	n/a	4.76	Erosion of natural deposits

Collection, sampling result information and table provided by Detroit Water and Sewerage Department (DWSD) Water Quality Division, ML Semegen.

Distribution system sampling & result information (including lead & copper) provided by the City of Flint Water Plant, M Glasgow.

Key to Detected Contaminants Table		
Symbol	**Abbreviation for**	**Definition/Explanation**
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MRDLG	Maximum Residual Disinfectant level goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
ppb	Parts per billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts per million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
ND	Not Detected	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total of all five.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromochloromethane and bromoform. Compliance is based on the total of all five.
pCi/l	picocuries per liter	A measure of radioactivity.
n/a	not applicable	
>	Greater than	

Usage	Commodity	Color
Water Lines	Raw Settled or Clarified Finished or Potable	Olive green Aqua Dark Blue
Chemical Lines	Alum or Primary Coagulant Ammonia Carbon Slurry Caustic Chlorine (Gas or Solution) Fluoride Lime Slurry Ozone Phosphate Compounds Polymers or Coagulant Aids Potassium Permanganate Soda Ash Sulfuric Acid Sulfur Dioxide	Orange White Black Yellow with Green Band Yellow Light Blue with Red Band Light Green Yellow with Orange Band Light Green with Red Band Orange with Green Band Violet Light Green with Orange Band Yellow with Red Band Light Green with Yellow Band
Waste Lines	Backwash Waste Sludge Sewer (Sanitary or Other)	Light Brown Dark Brown Dark Gray
Other	Compressed Air Gas Other Lines	Dark Green Red Light Gray

2615

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

February 5, 2015

Mr. John O'Brien, Director
Genesee County Drain Commissioner
G-4610 Beecher Road
Flint, Michigan 48532

WSSN: 2615

Dear Mr. O'Brien:

SUBJECT: 2014 Sanitary Survey, Genesee County Water System

This letter confirms my visit with Mr. Tim Davidek, Mr. Mark Horgan, and yourself on August 20, 2014, and September 4, 2014, and summarizes the subsequent review and discussion of the water supply facilities serving the Genesee County water system. The purpose of this meeting was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399) and the administrative rules adopted from Act 399. In addition, the enclosed Water System Sanitary Survey was updated to gather information on the Genesee County water system.

Our updated survey visit confirms that Genesee County Water and Waste Services Division (WWSD) continues to make substantial progress towards obtaining a new source of drinking water from the Karegnondi Water Authority (KWA). Construction permits have been issued for the raw water transmission main and pump stations. Construction of the raw water intake system is nearing completion and the crib structure was recently sunk in place. WWSD's water treatment plant (WTP) is also currently under preliminary design. Completion of this project is anticipated in 2016 and will provide Genesee County with a reliable source of drinking water of superior quality.

The updated survey also confirms that the WWSD is moving forward with upgrading their meter read system to a fixed-base radio read system. The radio read system is another water system improvement, as it will reduce the time needed for meter reading, enhance leak detection, and improve customer service. The WWSD is encouraged to complete their metering system project. The WWSD will also proceed with replacing deteriorated cast-iron watermains in the Dalton Subdivision in 2015, as part of their Drinking Water Revolving Fund project. This project, when completed, will improve the level of water service for residents in this area.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	No Deficiencies/Recommendations
Treatment	No Deficiencies/Recommendations
Distribution System	Recommendations made
Finished Water Storage	Recommendations made
Pumps (All dist. Pumping)	Recommendations made
Monitoring & Reporting	Recommendations made
Management & Operations	**Deficiency Identified**
Operator Compliance	No Deficiencies/Recommendations
Security	**Deficiency Identified**
Financial	Recommendations made
Other	Not applicable

The following deficiencies are violations of Act 399 and must be resolved in order to return the water system to compliance.

1. According to our records, a water system Emergency Response Plan (ERP) has not been prepared. The ERP provides an outline to follow in the event of a water related emergency (large main breaks, pump station failures, power outages, loss of pressure, contamination, etc.). The lack of an ERP for the Genesee County water system is a violation of R 325.12302(1)(a). An ERP needs to be prepared and be available for review during for our next routine surveillance visit. Enclosed is an ERP template which can be used for preparing Genesee County's water system ERP.

   Genesee County's ERP also needs to discuss short-term source reliability (present day - 2016) in the event of an interruption of water service from the Detroit Water and Sewage Department (DWSD). This needs to include the level of emergency service available from the Flint WTP in combination with back-up wells available to Genesee County and/or its wholesale customers. Also, the protocol for implementing these emergency options and conveyance to the county's system needs to be discussed in the ERP.

   The WWSD has identified its best solution for long-term source reliability (2016 and beyond) through a combination of raw water supply via the KWA and a raw water reservoir at the location of Genesee County's future WTP. Critical factors being evaluated towards this effort include; sizing of the raw water storage reservoir, level of service from the Flint WTP, finished storage capacity in excess of the established normal waterworks system requirements, and back-up well capacity for Genesee County and/or its wholesale customers. The WWSD has established a minimum of 10 days of raw water storage (based on projected future average day) as their starting point.

2. Establish a water service contract with the DWSD and provide us with a copy of the contract. We understand that Genesee County is under contract with the KWA for future source of supply (late 2016); however, the lack of available capacity obtained under contract and capable of delivery from another approved public water supply (PWS) is a violation of R 325.11204 (c). PWSs need to have established source capacity either by surface water, groundwater, or contractual agreement from another approved PWS to facilitate permitting extensions of the water system. The lack of a contractual agreement with the DWSD may limit our ability to issue Act 399 construction permits permitting expansion of Genesee County's water system.

Next, it is hoped that the following recommendations will prove useful in enhancing the operation and maintenance of your water supply.

1. Update the most recent water system Reliability Study (RS) by January 1, 2016, in order to meet the 5-year revision requirement established in Act 399. Also, recent amendments to Act 399 require additional items to be included in the RS. Enclosed is guidance material that you can use as reference in updating your RS.

2. Update the most recent water system General Plan (GP) by January 1, 2016. The updated GP needs to include the following information:

   - General layout of the entire waterworks system, including distribution system piping and the location of valves, hydrants, storage tanks, and master meter connections.

   - A hydraulic analysis of the distribution system showing pressure contours under peak demands and inventory of watermain by size, material, and age. The hydraulic model used in the RS can be used for the GP, provided that the model is updated to reflect more recent water distribution system improvements.

   - Service area map including existing and future service area boundaries.

   - Water System Capital Improvement Program for the 5-year and 20-year planning periods.

   Since the required elements in the GP and RS are similar, it may be worthwhile to update them concurrently.

3. Update the 2008 Bacteriological Sampling Site Plan. The updated plan needs to reflect minor changes in sampling locations and updated system contacts. A bacteriological sampling site plan template was provided to WWSD staff and can be used for preparing an updated plan. A copy of the updated sampling site plan needs to be provided to the Department of Environmental Quality (DEQ) for review and approval.

4. Perform a routine inspection of the Vassar Road and Houran Street ground storage tanks and the Houran Street elevated storage tank. Active water storage facilities should be scheduled for routine inspections on a five to ten year frequency. Please provide us with a copy of the inspection report for each tank after the work is completed.

5. Raze the existing water storage and pumping facilities that are permanently out of service. This includes the following:

   - Clio Plaza elevated tank
   - Orgould/Pierson Road ground storage tank
   - Elms/Pierson Road ground storage tank
   - Orgould Avenue pumping station
   - Clio Road pumping station
   - Van Slyke Road pumping station

   Although these facilities are electrically locked out and the dead-leg piping has been removed, they represent a potential safety liability. Complete removal of the structures will help to eliminate this liability.

6. Expand the valve turning program to allow for operation of all transmission main valves and distribution system valves in critical locations. A suggested approach, which has been successful in other water utilities, is to implement the program (by sections or quadrants) such that all valves are operated once every 4 or 5 years. The WWSD is encouraged to implement this approach as a means to expand their valve program.

7. Update the Monthly Operation Report (MOR) that re-designates the pumping stations as primary and secondary pumping stations. The updated MOR also needs to include pumpage from the Vassar Road and Fenton Road stations and be designated as a secondary pumping station. Pumpage from the Houran Street station should also be included as an estimate; however, we recommend that metering be installed at this station in order to obtain accurate pumpage data. Also, since the Henderson Road station occasionally boosts chlorine, the MOR needs to include chlorine feed parameters (amount of chlorine, dosage, residual, etc.) during the months that the equipment is in operation. A Class-D MOR template was provided to WWSD staff and the applicable page(s) in the template can be used for reporting the chlorine feed parameters.

8. Modify the Annual Pumpage Report (APR) to report the average day demand for the combined retail and wholesale service area. The APR also needs to report the entire service area's maximum day demand for each year.

Please submit a letter by March 13, 2015, that outlines the WWSD's plans and schedule to address the above items.

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. Dave Jansen, Genesee County
Mr. Mark Horgan, Genesee County
Mr. Tim Davidek, Genesee County

525 West Allegan Street
Lansing, MI 48909
Phone: 517-290-8817
Fax: 517-241-3571

WSSN: 02615

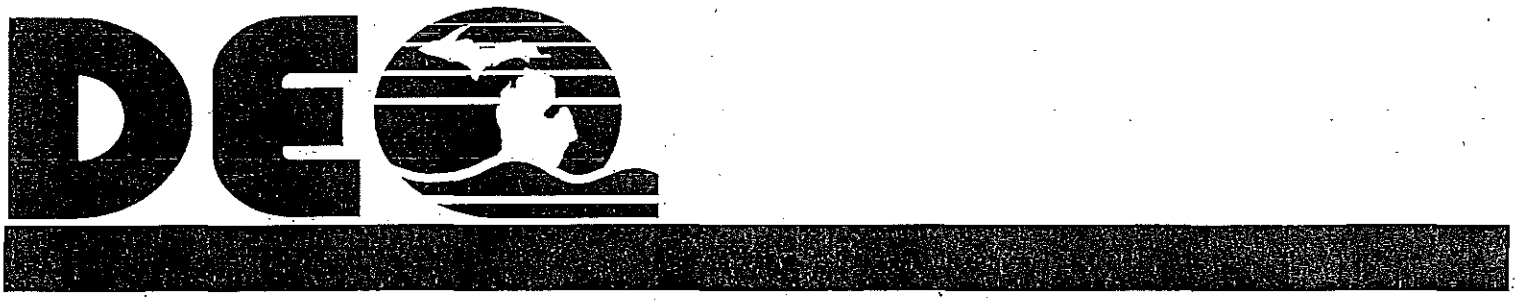
Office of Drinking Water and Municipal Assistance

Lansing District Office

Water System Sanitary Survey

Genesee County Water System

2014



Sanitary Survey of Community Water Supply - Review Summary

Water Supply: Genesee County Water System — WSSN: 02615
County: Genesee — District: 11
Evaluator: Mike Prysby — Date: 9/4/2014

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source				x			
Construction & Maintenance				x			
Standby Power				x			
Isolation		x					
Source Water Protection		x					
Capacity				x			
Treatment				x			
Disinfection				x			
Fluoride		x					
Phosphate Addition		x					
Softening		x					
Iron/Manganese Removal		x					
Arsenic Removal		x					
Pretreatment		x					
Filtration (gravity or membranes)		x					
C*T		x					
Other		x					
Distribution System					x		
Interconnections w/ Other WS				x			
Hydrants & Valves	*Expand valve program*				x		
Service Lines & Metering				x			
General Plan	*Update GP by 2016 & include CIP*				x		
Cross Connections				x			
Construction & Maintenance				x			
Capacity				x			
Finished Water Storage	*Raze storage facilities no longer in service*				x		
Construction & Maintenance	*Inspect Houran St. tanks and Vassar Rd tank*				x		
Controls				x			
Capacity				x			
Pumps (All Pumping Facilities)	*Raze pumping stations no longer in service*				x		
Construction & Maintenance	*Install metering at the Houran St. P.S.*				x		
Controls				x			
Capacity				x			
Monitoring & Reporting					x		
Bacteriological Monitoring	*Update 2008 sampling site plan*				x		
Chemical Monitoring				x			
MOR or Annual Pumpage Report	*Incl. all P.S.and CL2 parameters on MOR/ expand APR*				x		
Consumer Confidence Report				x			
Analytical Capabilities				x			
System Management & Operations					x		
Owner Responsibility	*Establish service contact w. DWSD*					x	
Capacity Development				x			
Reliability Study	*Update R.S. by 2016*				x		
Operations Oversight				x			
Permits				x			
Operator Compliance				x			
Operator Certification				x			
Technical Knowledge & Training				x			
Security						x	
Emergency Response Plan	*ERP needed and incl. provisions for source reliability*					x	
Site Security (Fences, Alarms...)				x			
Financial							
Rates				x			
Budget & Capital Imp. Plan	*Establish 5/20 yr CIP in conj. with updated GP*				x		
Other							

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

WATER SYSTEM SANITARY SURVEY

GENERAL

Basic Information

WSSN:	02615	Supply:	Genesee County	County:	Genesee
Date:	Sept. 4, 2014	Reviewed by:	Michael Prysby	District:	11 - Lansing

Primary Contact:	John O'Brien	Copy To:	Mark Horgan
SDWIS Role:		SDWIS Role:	
Title:	Director	Title:	Chief of O & M
Telephone:	810-732-7870	Telephone:	810-732-7870
Cell Phone:		Cell Phone:	
Pager:		Pager:	
Fax:		Fax:	
e-mail:	jfobrien@gcdcwws.com	e-mail:	mhorgan@gcdcwws.com
Address:	G-4610 Beecher Road	Address:	G-4610 Beecher Road
	Flint, MI 48532		Flint, MI 48532

Population: 71,500 Year: 2014 Basis: DEQ Estimate of retail customers

Operator Certification

Distribution Classification:	S-1	Certification	Op. #	Exp. Date
Operator in Charge:	Mark Horgan	S-1		
Backup Operator:	Tim Davidek	S-1		
Other Operators:	John O'Brien	S-1		
	Brian Ross	S-1		
	James Thompson	S-1		
	Vernon Brenner	S-2		
	Joe Anklam	S-2		
	Mark Horgan	S-2		
	Richard Bysko	S-3		
	Bill Hostetler	S-3		
	Ryan Lynn	S-2		
	Matt McKay (ARTP WWTP)	S-3		
	Matt McKay	S-3		
	Kevin Van Slickle	S-3		
	Adam Clark	S-4		
	Dave Jansen	S-4		
	Shannon Holder	S-4		
	Jan Jones	S-4		
	Dan Lince	S-4		
	Martin McCormick	S-4		
	Steven Olson	S-4		
	Steven Pelky	S-4		
	Leslie Rogers	S-4		
	Ron Schroeder (Linden WWTP)	S-4		
	Steven Shaski II	S-4		
	Lony Smith	S-4		
	Andy Williams	S-4		

Treatment Capacity: 16.0 MGD

Treatment Classification:	D-1	Certification	Op. #	Exp. Date
Operator in Charge:	Dave Jansen	D-1, F-1		
Backup Operator:	Joe Anklam	D-4		
Other Operators:	Kevin VanSlickle	F-1		
	Brian Ross	F-3		
	Connie Hohman	F-4		
	Kimberly Wahl	F-4		
	Vern Brenner	F-4, D-4		

Do the operators receive adequate technical training? yes

If not, what and why?

Ownership

Ownership: Genesee County (City, Village, Township, County, Authority, Association)

Consent Agreement:

Escrow Account:

Annual Fee: Paid (Paid, Unpaid, Exempt, Etc.)

Comments:

Comments:

Operator Certification Comments:
The Waste & Water Services Division (WWSD) continues to maintain a proactive position towards promoting operator certification and maintains incentives for achieving operator certification. The WWSD maintains a mandatory certification requirement for any distribution system employee who wishes to advance from an operator assistant or meter reader position to an operator position. A bonus incentive program is also in place for operators who obtain distribution system certification above the level required for their specific position. Certified operators help protect the county's investment in the system, and help ensure that the system meets the requirements of the Michigan Safe Drinking Water Act (MSDWA).

Table 1. Operator Positions

OPERATOR POSITIONS	REQUIREMENTS
Operator Assistant 1 & 2	None
Meter Reader	None
Operator	S-4
Maintenance Mechanic Equipment Operator Senior O & M Operator	S-4 or minimum of 4 years experience
Supervisory level	S-3

Introductory Comments:

The Genesee County Drain Commissioner provides purchased water to a large percentage of Genesee County directly from the Detroit Water and Sewerage Department (DWSD) as of May 2014. Water service is provided to 19 wholesale and retail customers (8 wholesale and 11 retail customers).

The wholesale customers purchase water from the county through master meter(s) and these customers own and maintain the distribution system piping with their local service area. Each wholesale customer has a viable water department.

The retail customers have very little involvement with water utility operation. The WWSD controls design, construction, and operation of the water system for these customers. The retail customers, however, are responsible for collecting the water bills from their individual accounts. Table 2 below shows the breakdown of the county's wholesale and retail customers.

Table 2. Wholesale and retail Customers of Genesee County

Wholesale Customer	No. of Accts. (Pop.)	Retail Customer	No. of Accts. (Pop)
City of Burton	6,734 (21,000)	Clayton Township	867 (2,948)
City of Clio	990 (2,646)	Davison Township	2,696 (9,166)
City of Flushing	3,363 (8,389)	Flint Township	7,678 (26,105)
City of Mt. Morris	1,355 (3,086)	Flushing Township	2,563 (8,714)
City of Montrose	658 (1,657)	Gaines Township	489 (1,663)
City of Swartz Creek	2,176 (5,758)	Mt. Morris Township	3,189 (10,843)
Genesee Township	2,129 (10,500)	Montrose Township	286 (972)
Grand Blanc Township	6,695 (18,000)	Mundy Township	1,391 (4,729)
		Richfield Township	673 (2,288)
		Vienna Township	1,201 (4,083)
		Thetford Township	4 (14)
Total Wholesale	24,100 (71,036)	Total Retail	21,037 (71,526)

The 2014 population is based on our September 4, 2014, sanitary survey meeting and an estimate of 3.4 persons per account. Genesee County's estimated retail service area population is approximately 71,500 people. The combined wholesale and retail customer service area serves approximately 142,600 people.

WELL INFORMATION
Layne-Northern constructed a 6-inch test/exploration well at the Henderson Road pump station site. The test-well was constructed to a depth of 365 feet with a 6-inch PVC casing to 200 feet. The well was pumped at 220 GPM with a drawdown to 60 feet. Layne estimates that the aquifer could support a 350 - 400 GPM well for long term pumpage and possibly above 500 GPM for a short term emergency supply. The WWSD has not proceeded in converting the test well to a production well for additional emergency capacity.

Conclusions and Recommendations

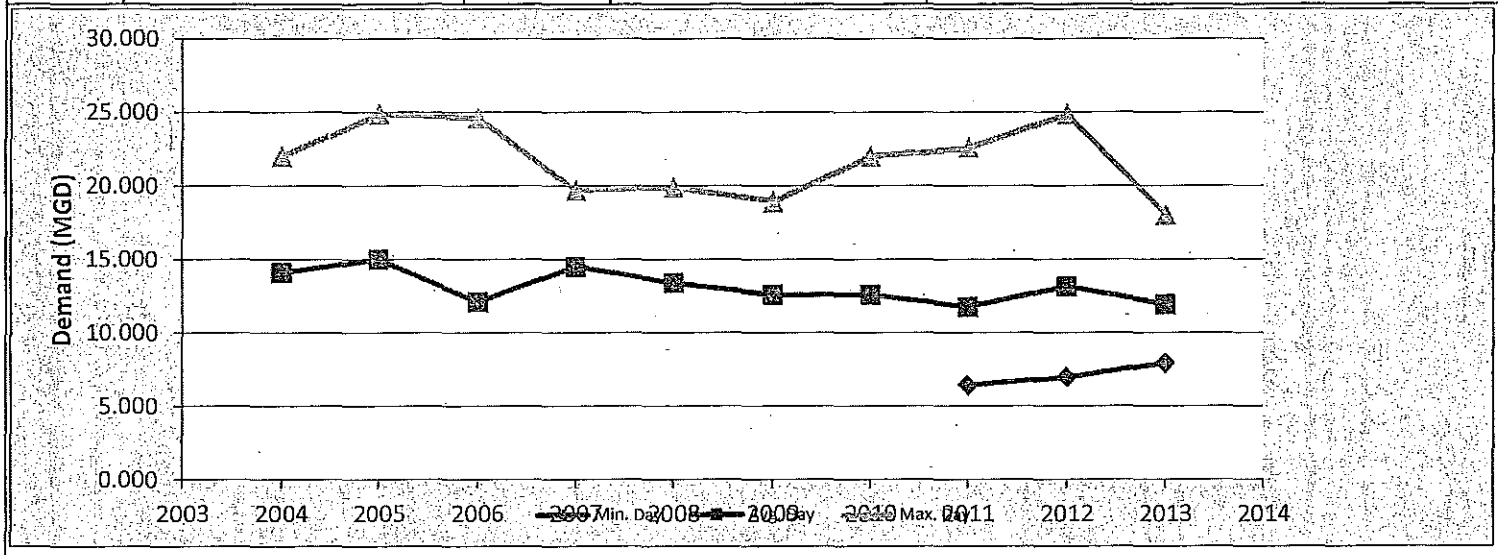
The Genesee County Drain Commissioner, Waste and Water Services Division (WWSD) currently serve a population of nearly 143,000 through a countywide network of transmission and distribution mains. Additional booster pumping stations and storage facilities have been provided to enhance service. The WWSD currently utilizes 27 full-time certified employees for water utility operations. The operator in charge (OIC), Mark Horgan, holds an S-1 license and plays an active role in distribution system operation and maintenance, thus, the WWSD complies with the operator certification requirement. Also, as part of compliance with the operator certification requirement, Tim Davidek, is the designated back-up operator.

WWSD continues to promote operator certification and requires new employees to obtain distribution certification for further advancement. The WWSD also continues to maintain the safety and training officer position to assist and promote an adequate level of operator certification. Certified operators help to protect the county's investment in the water system and to meet the requirements of the Safety Drinking Water Act and we encourage the county to continue to promote operator certification.

SOURCE

Capacity

Year	Demand (MGD) Max. Day	Date	Avg. Day	Min. Day	Date	Max/Avg	Population History	G/C/D	% unacct.H_2O
2004	22.000		14.100			1.560284			
2005	24.900		15.000			1.66			
2006	24.600		12.100			2.033058			
2007	19.700		14.500			1.358621			
2008	19.900		13.400			1.485075			
2009	18.900		12.600			1.5			
2010	22.000		12.600			1.746032			
2011	22.580		11.760	6.440		1.920068			
2012	24.850		13.160	6.970		1.888298			
2013	18.010		11.940	7.940		1.508375	142,600	83.7	



Five Year Max. Day	24.850
Ten year Max. Day	24.900
Five Year Avg. Day	12.412
Max Day for capacity requirements:	24.900

Purchase Contract

Principle Parities of Contract: GCDC & DWSD

Date of Contract: See comments

Expiration Date:

Annual Volume Available by Contract:		MG
Maximum Day Available by Contract:		MGD
Maximum Hour Available by Contract:		GPH
Maximum Pressure Allowed by Contract:		PSI
Minimum Pressure Required by Contract:		PSI

Comments:
The city of Flint discontinued purchasing water from the DWSD and GCDC is now a direct customer of DWSD; however a service contract has not been established.

Annual Max Day Usage @ each pumping station (2004 - 2013)

The GCDC water service area is divided into five pressure districts and are as follows: Central Pressure Zone (HGL - 930'), Grand Blanc Pressure Zone (HGL 970'), South Pressure Zone (HGL 1050'), High Pressure Zone (HGL - 1150') and the North Pressure Zone (HGL - 850'). Each pump station, described below, provides service to one or more of the above pressure districts. A map of GCDC's pressure districts is included in Appendix A.

The Genesee County system has three Primary pumping stations (direct feed/metered from the 72-inch transmission main) and four Secondary stations (re-pumps water from one of the primary stations)

The Henderson Road pumping station has been in service since 2006 and pumps between 3 and 6 MGD into Genesee County's North Loop which reduces the demand off the Center Road pump stations. The Center Road North (CRN) pump station has been in service since 1989 and pumps water to the west side of Genesee County. The Center Road South (CRS) pump station has been in service since 2007 and pumps water to the eastern portion of Grand Blanc Township and to the Vassar Road station.

SCADA system improvements allows the WWSD to report average and maximum day demands from their pumping stations. The Houran Street station is not metered; however, flow through this station is estimated by accounting pump run time.

The GCDC monthly operation report numbers are obtained from SCADA and flow rate is calculated (daily average, max, and min). Pumpage obtained from the SCADA system and reported in the MORs is slightly less than the purchased water reported in the annual pumpage report due to a portion of the county's customer base being provided water upstream of the Center Road pumping station (direct connections to the 30 inch transmission main. The pump stations also draw off of and pump to various storage facilities. The demand created by the water storage tanks does not always match the system.

2008

Primary Pumping Stations

	Avg Day	Max Day
Total Flow:	13.4 MGD	MGD
Henderson Rd:	5.19 MGD	7.07 MGD
Center Rd North:	6.83 MGD	10.54 MGD
Center Rd South:	0.74 MGD	10.07 MGD

Secondary Pumping Stations

Noble Street	0.28 MGD	1.07 MGD
Vassar Road		
Fenton Road		
Houran Street		

2009

Primary Pumping Stations

	Avg Day	Max Day
Total Flow:	12.6 MGD	MGD
Henderson Road:	3.44 MGD	6.91 MGD
Center Rd North:	4.66 MGD	7.00 MDG
Center Rd South:	1.77 MGD	5.38 MGD

Secondary Pumping Stations

Noble Street:	.29 MGD	0.79 MGD
Vassar Road:		
Fenton Road:		
Houran Street:		

2010

Primary Pumping Stations

	Avg Day	Max Day
Total Flow	12.6 MGD	22.0 MGD
Henderson Rd:	3.14 MGD	7.37 MGD
Center Rd North:	3.83 MGD	6.19 MGD
Center Rd South:	2.46 MGD	5.83 MGD

Secondary Pumping Stations

Noble Street:	0.38 MGD	1.13 MGD
Vassar Road		
Fenton Road:		
Houran Street:	0.00 MGD	0.00 MGD

2011

Primary Pumping Stations

	Avg Day	Max Day
Total Flow	11.76 MGD	22.58 MGD
Henderson Rd:	3.21 MGD	8.04 MGD
Center Rd North:	3.97 MGD	6.11 MGD
Center Rd South:	2.40 MGD	5.53 MGD

Secondary Pumping Stations

Noble Street:	0.32 MGD	1.09 MGD
Vassar Road:		
Fenton Road:		
Houran Street:	0.00 MGD	0.00 MGD

2012

Primary Pumping Stations

	Avg Day	Max Day
Total Flow	13.16 MGD	24.85 MGD
Henderson Rd:	3.64 MGD	8.72 MGD
Center Rd North:	3.74 MGD	6.06 MGD
Center Rd South:	2.35 MGD	7.02 MGD

Secondary Pumping Stations

Noble Street:	0.31 MGD	1.74 MGD
Vassar Road:		
Fenton Road:		
Houran Street:	0.00 MGD	0.00 MGD

2013

Primary Pumping Stations

	Avg Day	Max Day
Total Flow	11.94 MGD	18.01 MGD
Henderson Rd:	3.03 MGD	6.45 MGD
Center Rd North:	3.43 MGD	5.31 MGD
Center Rd South:	2.29 MGD	4.14 MGD

Secondary Pumping Stations

Noble Street:	0.31 MGD	0.88 MGD
Vassar Road:		
Fenton Road:		
Houran Street:	0.00 MGD	0.00 MGD

STORAGE

Construction, Controls & Maintenance				
Location	Maple/Center Rd N	Houran/Beecher	Beecher	Noble
SDWIS Facility ID (Site Code)				
Volume	5.0 MG	Two 2.0 MG	1.0 MG	4.0 MG
Type	Ground	St. Ground	Elevated	Standpipe
Material	Concrete	steel		
O.F. Elevation	38.0 ft	778.5 ft	930 ft USGS	930 ft
Date Constructed	1988	1970	1970	1968
Date Inspected	2007	2005 - **DUE**	2012 - Dixon	2011
Date Painted Inside	na	2005	2012 - spot repair	200
Paint System	na	3 coat exp.	2 coat exp	3 coat exp
NSF Std 61 Compliant (Y/N)	na	yes	yes	yes
Date Painted Outside	na	2005	2012	2000
Cathodic Protection	na	Yes - 1992	yes - installed in 2012	Yes - 1991
Tank Isolation Valve				
Tank Drain (Hydrant)				
Altitude Valve	yes	yes		yes
Mud Valve				
High Alarm	Yes	Yes	Yes	Yes
Low Alarm	Yes	Yes	Yes	Yes
Alarms Received By	SCADA	SCADA	SCADA	SCADA
Total Head Range (Feet)				
Normal High Water Level				
Normal Low Water level				
Normal/Average Pressure				
Data Recording System				
Control Signal Type	radio	radio	radio	radio
Auxiliary Power for Controls?			Yes	
Control System Adequate?	Yes	Yes	Yes	Yes
Vents Screened	GCDC inspects yearly	GCDC inspects yearly	GCDC inspects yearly	GCDC insp. Yearly
Overflow Screened	weighted flapper	weighted flapper	weighted flapper	weighted flapper
Access Hatches Locked	Yes	yes	yes	yes
Expansion Collar Lubricated				
Mixing System	no	no	no	no
Overflow Splash Pad	yes	no	no	no
Adequate Security?	yes	yes	yes	yes
Operator Visit Frequency				
Comments:				

Total System Storage Capacity			
Usable Storage	46,400,000		
Total Usable Storage (gal)	23,200,000	23.200	Mgal
Total Usable Storage/Max Day	93%		
Total Usable Storage/Avg. Day	187%		

Comments:
Total usable storage for emergencies is based on the assumption that the storage tanks are half full.

STORAGE

Construction, Controls & Maintenance				
Location	Orgould/Pierson	Clio Rd	McKinley ARTP	Clio Plaza
SDWIS Facility ID (Site Code)				
Volume	.50 MG	1.0 MG	.5 MG	.10 MG
Type	St. ground	Composite	Elevated	Elevated
Material				
O.F. Elevation	793 ft	930 ft USGS	784 ft	855 ft
Date Constructed		1982	1975	1974
Date Inspected		2011	2010 -warr	2009
Date Painted Inside	1982	1999	1994	1974
Paint System		3 coat epxy	3 coat epxy	
NSF Std 61 Compliant (Y/N)				
Date Painted Outside	2000	1999	2009	1974
Cathodic Protection		no	Yes	
Tank Isolation Valve				
Tank Drain (Hydrant)				
Altitude Valve				
Mud Valve				
High Alarm	out of service	Yes	Yes	out of service
Low Alarm	out of service	Yes	Yes	out of service
Alarms Received By	out of service	SCADA	SCADA	out of service
Total Head Range (Feet)				
Normal High Water Level				
Normal Low Water level				
Normal/Average Pressure				
Data Recording System				
Control Signal Type		radio	radio	
Auxiliary Power for Controls?				
Control System Adequate?		yes	yes	
Vents Screened		GCDC insp. yearly	GCDC insp. Yearly	
Overflow Screened		weighted flapper	weighted flapper	
Access Hatches Locked		yes	yes	
Expansion Collar Lubricated				
Mixing System				
Overflow Splash Pad				
Adequate Security?				
Operator Visit Frequency				
Comments:				

Capacity			
Usable Storage			
Total Usable Storage (gal)	0	0.000	Mgal
Total Usable Storage/Max Day	0%		
Total Usable Storage/Avg Day	0%		
Comments:			

STORAGE

Construction, Controls & Maintenance				
Location	Pierson/Elms	Center Rd S	Vassar Rd	Henderson Rd
SDWIS Facility ID (Site Code)				
Volume	.5 MG	6.3 MG	1.0 MG	2-10.0 MG
Type	Ground	Ground	Ground	Ground
Material				
O.F. Elevation	770 ft			
Date Constructed		2005	2003	2004
Date Inspected		2006	2003 DUE	2013
Date Painted Inside		n/a	n/a	n/a
Paint System		Concrete	Concrete	Concrete
NSF Std 61 Compliant (Y/N)				
Date Painted Outside		n/a	n/a	n/a
Cathodic Protection		n/a	n/a	n/a
Tank Isolation Valve				
Tank Drain (Hydrant)				
Altitude Valve		yes	yes	press flow control
Mud Valve				
High Alarm	out of service	Yes	Yes	Yes
Low Alarm	out of service	Yes	Yes	Yes
Alarms Received By	out of service	SCADA	SCADA	SCADA
Total Head Range (Feet)				
Normal High Water Level				
Normal Low Water level				
Normal/Average Pressure				
Data Recording System				
Control Signal Type		radio	radio	radio
Auxiliary Power for Controls?				
Control System Adequate?		yes	yes	yes
Vents Screened		GCDC insp. yearly	GCDC insp. yearly	GCDC insp yearly
Overflow Screened		yes - tide flex valve	yes	yes
Access Hatches Locked		yes	yes	yes
Expansion Collar Lubricated				
Mixing System		no	no	no
Overflow Splash Pad		yes	yes	yes
Adequate Security?		yes	yes	yes
Operator Visit Frequency				
Comments:				

Capacity			
Usable Storage			
Total Usable Storage (gal)	0	0.000	Mgal
Total Usable Storage/Max Day	0%		
Total Usable Storage/Avg. Day	0%		
Comments:			

STORAGE

Construction, Controls & Maintenance	
Location	Houran St
SDWIS Facility ID (Site Code)	
Volume	2.0 MG
Type	Ele/Composite
Material	
O.F. Elevation	
Date Constructed	2006
Date Inspected	2006 (Due)
Date Painted Inside	n/a
Paint System	3 coat epoxy
NSF Std 61 Compliant (Y/N)	
Date Painted Outside	2006
Cathodic Protection	
Tank Isolation Valve	
Tank Drain (Hydrant)	
Altitude Valve	
Mud Valve	
High Alarm	Yes
Low Alarm	Yes
Alarms Received By	SCADA
Total Head Range (Feet)	
Normal High Water Level	
Normal Low Water level	
Normal/Average Pressure	
Data Recording System	
Control Signal Type	radio
Auxiliary Power for Controls?	
Control System Adequate?	yes
Vents Screened	GCDC insp. Yearly
Overflow Screened	weighted flapper
Access Hatches Locked	yes
Expansion Collar Lubricated	
Mixing System	no
Overflow Splash Pad	yes
Adequate Security?	yes
Operator Visit Frequency	
Comments:	

Capacity	
Usable Storage	
Total Usable Storage (gal)	0
Total Usable Storage/Max Day	0%
Total Usable Storage/Avg Day	0%
Comments:	

Comments:

The Beecher Road tank establishes the main control point for the county's SCADA system. The Henderson Road ground storage tanks are equipped with pressure/flow control valves. These valves along with the SCADA system monitor and control flow to each tank. The 2-Mgal hydro-pillar at Houran Street houses repair equipment and a portable stand-by power generator at its base. The water level in the tank is controlled by an altitude valve located at its base. Genesee County's water storage facilities are radio controlled and a dedicated phone line is provided as a back-up to the radio control system

Repairs to the Clio Plaza tank roof were completed in 2010; however, the tank is no longer in service. The Orgould Avenue tank and the ground storage tank at Pierson and Elms Road also remain out of service.

The Beecher Road tank was inspected and repainted (exterior) in 2012. The Henderson Road tanks were inspected in 2012 by Natgun and were found to be in good condition. A leak in the base of the northeast tank was repaired in 2014. Jim Thompson climbs each tank on a yearly basis to check and, as needed, repair or replace vent screens.

Conclusions and Recommendations

The WWSD currently has 10 potable water storage facilities in service providing approximately 46 million gallons of storage. Three water storage tanks (Clio Plaza, Orgould/Pierson , and Pierson/Elms) remain out of service and it appears that there are no plans to re-use these facilities. We recommend that these water storage tanks be razed.

Based upon our review, the ground storage tanks and elevated tank at Houran Street and the ground storage tank at Vassar Road are due for a routine inspection. We recommend that these structures be scheduled for an inspection in 2015.

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies?	Yes
If yes, list WSSN number (s):	DWSD 1800
No. of Emergency Connections:	1 - Flint

Location	Main Size	Capacity	Metered?	Status (Regular/Emergency)	WSSN of
Henderson Road *	36-inch	30.0 MGD	Yes	Reg.	1800
Henderson Road * south pit	36-inch	30.0 MGD	Yes	Reg.	
S. Genesee Pit *	30-inch	16.5 MGD	Yes	Reg.	
Oak & Potter*	12-inch	8.15 MGD	10-inch	Reg.	
Irish & Potter*	20-inch	4.46 MGD	6-inch	Reg.	
Belsay & Potter*	12-inch	4.46 MGD	6-inch	Reg.	
M-15 & Potter*	12-inch	8.15 MGD	10-inch	Reg.	
North Genesee Pit *	12-inch	not used	10-inch	Closed	
Francis Road	12-inch		2 way	Reg.	
Donaldson Street**	12-inch		yes	Emerg.	2310
Pierson & Clio	not used	not used	N/A		
Carpenter Road	not used	not used	N/A		

Are valves exercised annually? _____

Flushed? _____

Comments:

*Direct connection to the 72-inch main upstream of the city of Flint.

** Emergency connection with city of Flint (westside in vicinity of Houran Street P.S.)

Genesee County no longer purchases water wholesale from the city of Flint since Flint treats their water from the Flint River (interim source until water from the KWA Authority becomes available - 2016). Genesee County purchases water from the DWSD and has acquired ownership of the 72-inch transmission main from Baxter & Potter west to the Genesee Road meter pit. Genesee County will remain a customer of the DWSD until construction of their WTP to treat raw water from Lake Huron via the KWA Water Authority is completed (est. mid 2016). A water service contract between DWSD and Genesee County had not been established at the time of the survey.

The estimated capacity of each connection is based on line pressure at Baxter & Potter (B&P) of 55 psi (DWSD side) and 45 psi (GCDC side). WWSD now operates and maintains the metering pit at B&P. Valve control and pressure monitoring are brought back to SCADA located at WWSD's O&M office .

Water is available to the county through Flint's distribution system from Donaldson Street through the Houran Street pumping station as an emergency back-up; however, the capacity has not been determined.

The flow into the Genesee County water system = Henderson Road
+South Genesee Pit
+Irish & Potter
+Belsay & Potter
+M-15 & Potter
+Oak & Potter

The majority of flow into Genesee County is through the Henderson Road pit and the South Genesee pit. Four other metered connections off the 72-inch transmission main along Potter Road provide water service to portions of Davison Township, the city of Burton, and Richfield Township.

Flow through the Francis Road pit is sold to Genesee Township and is not a direct connection off the 72-inch transmission main (constitutes a portion of the Henderson Road flow.)

Distribution Piping

Mains by Material	
Cast Iron	2%
Ductile Iron	98%
PVC	0%
Asbestos-Cement	0%
HDPE	
Galvanized	
Concrete	<2%

Mains by Size		
2 &4"	17,220 LF	1%
6"	455,857 LF	16%
8"	884,909 LF	31%
10"	24,558 LF	1%
12"	853,582 LF	30%
16"	251,524 LF	9%
20"	37,541 LF	1%
24"	78,536 LF	3%
30"	89,619 LF	3%
36"	107,763 LF	4%
72"	55,601 LF	1.7%

Mains by Age		
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	

Estimated percent of piping with coal tar lining 0 %

Comments:

A 16-inch watermain was installed along Fenton Road in Burton in 2011 making municipal water available to the Twin Meadows and Delta MHPS. Genesee County acquired ownership of the 72-inch transmission main from Baxter & Potter Road west to the Genesee Road meter pit in 2014.

Watermain inventory is available from WWSD's GIS database.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? Yes

If yes, identify locations:
- WWTP where cast iron mains exist
- Dalton Sub - Cast iron mains
- Linden Road section (Cast Fe) 2/3 mile
- Pierson Road (Cast-Fe) 2 to 3 miles

Comments:

The majority of the county's piping network consists of ductile iron mains. The areas noted above have not recently experienced frequent main breaks, however, these mains have had a prior history of more frequent repairs. GCDC plans to replace older cast-iron watermains in Dalton Subdivision in 2015 (DWRF project). The mains listed above comprise a portion of the county's retail customer area and are township owned; however, Genesee County performs repairs as part of their retail customer O&M agreement. Genesee County has recommended to the local townships to replace these watermains.

Are there areas where aesthetic water quality complaints are frequent? No

If yes, identify locations:

Comments:

Do you receive complaints alleging illness due to the water? No

If yes, identify locations:

Comments:

Are there areas where customers complain of low pressure? No

If yes, identify locations:

Comments:

What is the procedure to respond to and track these complaints?

Comments:

Distribution System Capacity

Are there areas where peak flows (including fire flow) cannot be maintained? see comments

If yes, identify locations:

Comments:

WWSD's most recent Reliability Study (RS) did not identify areas that are unable to provide the desired level of fire protection under peak flow..

Last ISO report date? No ISO rating for entire service area Rating

Proposed distribution system improvements:

Location:	Estimated Completion Date
Bristol Road	completed
Linden Road - coordinating with local township	Not completed
Pierson Road - coordinating with local township	Not completed
Elms & Lennon looping project	Completed
Lennon & Dye Road	Completed

General Distribution System Comments:

Consoer Townsend Evirodyne Engineers (CTE) completed the North Loop - Phase III study in 2000 along with a water system master plan and met the criteria of an acceptable Reliability Study (RS). The study was updated in 2005 (noted as "Appendix C Update of Final Report North Loop - Phase III Study"). The 2005 update evaluated alternatives to supply Grand Blanc Township via the new CRS pumping station. The CRN pumping station would be dedicated to supply the service areas further west into the county. The update also identified other major projects including: the Southeast loop, Thompson Road corridor, and the Coldwater Road transmission main.

Since 2000, the North Loop transmission main, Southeast Loop, Fenton Road extension, Henderson Road pumping station, and CRS pumping station were completed.

The hydraulic model used in the 2005 study was updated in 2011 to revise pressure district boundaries. An updated water system Master Plan was also prepared.

Several of the existing meter pits between Genesee County and the city of Flint including Orgould Avenue, Clio Road, and Van Slyke Road, have been decommissioned . The meter pits along with the pumping, storage facilities have been electrically locked out, and the majority of dead-leg piping was eliminated at these facilities.

Genesee County continues to charge its retail customers $35.00 per hydrant to maintain the appurtenance and to conduct routine flushing. Flint Township and Flushing Township continue to flush and winterize hydrants in their jurisdiction order to avoid the $35.00 charge per hydrant and flushing is conducted by the local fire department within each township. The WWSD continues to review hydrant operation each year with each fire department. WWSD staff also repair any inoperable hydrants after notification from its retail customer.

Conclusions and Recommendations - Transmission/Distribution

Genesee County's water system consists of an extensive county-wide network of transmission and distribution system piping. The majority of this piping is relatively new and is in good condition. Since the 2011 survey, the WWSD has obtained a construction permit to replace deteriorated cast-iron piping in the Dalton Subdivision (DWRF project) and the project expected to be completed in 2015. There are other areas of existing cast-iron mains which have not been replaced and have had a history of more frequent main breaks that include portions of the Pierson and Linden Road corridor. Although these areas do not represent a significant percentage of the system, the WWSD needs to include these areas as part of a Water System Capital Improvements Program (WSCIP) (Ref. Conclusions and Recommendations - General Plan).

Genesee County's hydraulic model (from the North Loop Study) was updated in 2011 and a copy of the water system Master Plan (based on the updated model) was provided to the DEQ. WWSD's water system RS; however, needs to be updated by January 1, 2016. A list of elements that are required in the RS is included in this survey. (Ref. Conclusions and Recommendations - Reliability Study).

The DEQ recommends that the WWSD raze any storage facilities that are to remain permanently out

DISTRIBUTION

Pump Stations - Henderson Road

	Location:	Henderson Road Station - **Primary pumping Sta.**		
	Function:	Boosts pressures to feed North Loop		
	Adequate Security?			
Pump Number	1	2	3	
Year Installed	2004	2004	2004	
Type	Hor Centr	Hor Centr	Hor Centr	
Permit Capacity	8.0 MGD	8.0 MGD	14.0 MGD	
Permit TDH				
Current Capacity	8.0 MGD	8.0 MDG	14.0 MGD	
Current TDH	255 ft	255 ft	255 ft	
Basis				
HP	500	500	500	
Last Complete Inspection				
Last Efficiency Test				
Control Signal Type	radio	radio	radio	
Controls Adequate?	yes	yes	yes	
Operator Visit Frequency				

The Henderson Road pumping station was constructed in 2004 and has been in operation since April 2006. The station's average day pumpage is between 3 and 6 MGD. Pumps #1 and #2 are equipped with a VFD. This station is one of the **Primary** pumping stations since it pumps directly off the 72-inch transmission main before distribution. This station serves the North Pressure Zone and a portion of the Central Pressure Zone.

The station has operated on only one pump to maintain system demand. It has not been necessary to operate the larger pump.

AUXILIARY POWER

Power Type	Engine Generator	Power Rating (kWh)	1000
Fuel Type	#2 Diesel	Starting Frequency	weekly
Capacity (gpm)	24 hr operation	Load Testing Frequency	1 year

Total Pump Capacity (gpm)	30	mgd	
Firm Pump Capacity (gpm)	16	mgd	
Auxiliary Power Capacity (gpm)		mgd	
Max Day Demand @ this location	8.7	mgd	(2009-2013)
Peak Hour @ this location		gpm	(Hydropneumatic Stations)
Avg Day Demand @ this location	3.3	mgd	(2011 - 2013 avg.)
Firm Pump Capacity/Max Day	>100	%	
Peak Hour/Firm Pumping Capacity		%	(Hydropneumatic Stations)
Aux. Power Capacity/Avg Day	>100	%	

Comments:

The Henderson Road pumping station is equipped with gas chlorination and the feed system is used during the late summer months to boost chlorine residuals in the western portion of the service area. The feed system consists of two-150 pound cylinders on a direct read scale, two Wallace and Tierman vacuum operated solution feed pumps with a maximum capacity of 500 pounds per day, and a vacuum regulator with automatic switch-over. Additional application points are provided at the reservoir inlets. A Wallace & Tierman two point chlorine gas leak detector and gas sensor with a sensitivity to 1.0 part per billion is provided.

An automatic chlorine residual analyzer monitors chlorine residual on the discharge side of the pump station at all times.

DISTRIBUTION

Pump Stations - Center Road North (CRN)

	Location:	Center Road North Pump Station - **Primary** P.S.		
	Function:	Boosts pressures to Central Pressure Zone (930ft HGL)		
	Adequate Security?			
Pump Number	1	2	3	4
Year Installed	1990	1990	1990	1990
Type	Hor Centr	Hor Centr	Hor Centr	Hor Centr
Permit Capacity	6.7 MGD	6.7 MGD	6.7 MGD	6.7 MGD
Permit TDH				
Current Capacity	8.5 MGD	8.5 MGD	8.5 MGD	8.5 MGD
Current TDH	211 ft	211 ft	211 ft	211 ft
Basis	estimate	estimate	estimate	estimate
HP	350	350	350	350
Last Complete Inspection	2007	2004	2004	2004
Last Efficiency Test				
Control Signal Type	radio	radio	radio	radio
Controls Adequate?	yes	yes	yes	yes
Operator Visit Frequency				
Comments:				

AUXILIARY POWER

Power Type	2nd sub-station	Power Rating (kWh)	
Fuel Type	n/a	Starting Frequency	
Capacity (gpm)	na/	Load Testing Frequency	

Total Pump Capacity (gpm)	34	mgd	
Firm Pump Capacity (gpm)	25.5	mgd	
Auxiliary Power Capacity (gpm)		mgd	
Max Day Demand @ this location	7	mgd	(2009 - 2013)
Peak Hour @ this location		gpm	(Hydropneumatic Stations)
Avg Day Demand @ this location	3.7	mgd	(2011-2013 average)
Firm Pump Capacity/Max Day	>100	%	
Peak Hour/Firm Pumping Capacity		%	(Hydropneumatic Stations)
Aux. Power Capacity/Avg Day		%	

Comments:

Water demands on CRN has stabilized to approximately 3.5 to 4.0 MGD. Water pumpage data specific to the CRN station is available with the county's SCADA system upgrades.

The CRN station's main purpose is to pump water to west Grand Blanc Township and to locations further west in Genesee County's Central Pressure Zone (HGL- 930 Ft) and functions as one of the county's **Primary** pumping stations.

The permit capacity of each pump at CRN was 6.7 MGD, however, these pumps are capable of pumping approximately 8.5 - 9.0 MGD. Pumps #1 and #2 are controlled by a variable frequency drive (VFD). Pumps #3 and #4 are constant speed pumps.

Pumps #1 and #2 operate constantly and are controlled by the water level in the Saginaw Street elevated tank in Grand Blanc Township. WWSD's SCADA system can switch the control point for the CRN station to the elevated tank at Beecher Road. Pumps #3 and #4 serve as back-up pumps for the CRN station.
New VFDs were installed on pumps #1 and #2 in 2008. Two spare motors are stored in the pump station.
WWSD staff maintain all pumps and track electrical usage.

DISTRIBUTION

Pump Stations - Center Road South (CRS)

	Location:	Center Road South Pump Station - **Primary P.S.**		
	Function:	Boosts pressures to east portion of Grand Blanc Township		
	Adequate Security?			
Pump Number	1	2	3	
Year Installed	2006	2006	2006	
Type	Hor Centr	Hor Centr	Hor Centr	
Permit Capacity	6.0 MGD	6.0 MGD	6.0 MGD	
Permit TDH				
Current Capacity	6.0 MGD	6.0 MGD	6.0 MGD	
Current TDH				
Basis	estimate	estimate	estimate	
HP	400	400	400	
Last Complete Inspection	2006	2006	2006	
Last Efficiency Test	2006	2006		
Control Signal Type				
Controls Adequate?				
Operator Visit Frequency				

Comments:

The current capacity of each pump is approximately 6.0 MGD. The combined capacity of the station with 2 pumps operating is approximately 11 MGD. All three pumps are VFD controlled.

The CRS station pumps water from the adjacent 6.3 MGAL ground storage tank and distributes it to the eastern portion of Grand Blanc Township - Saginaw tank (970 ft press. district) and also functions as a **Primary** pumping station. The ground storage tank is equipped with an altitude valve to control the tank level. A flow control valve is also provided in order to control the upstream pressure in the 30-inch transmission main along Center Road. System status is monitored and controlled at the WWSD administrative office via WWSD's SCADA system.

AUXILIARY POWER

Power Type	on-site generator	Power Rating (kWh)	1040
Fuel Type	Diesel	Starting Frequency	1/week under load
Capacity (gpm)	operates 2 pumps	Load Testing Frequency	weekly

Total Pump Capacity (gpm)	17	mgd	
Firm Pump Capacity (gpm)	11	mgd	
Auxiliary Power Capacity (gpm)	11	mgd	
Max Day Demand @ this location	7	mgd	(2009-2013)
Peak Hour @ this location		gpm	(Hydropneumatic Stations)
Avg Day Demand @ this location	2.35	mgd	(2011-2013 avg)
Firm Pump Capacity/Max Day	>100	%	
Peak Hour/Firm Pumping Capacity		%	(Hydropneumatic Stations)
Aux. Power Capacity/Avg Day	>100	%	

Comments:

The ADD has stabilized to between 2 and 3 MGD.

DISTRIBUTION

Pump Stations - Noble Street P.S.

Location:	South end of Noble Street, Flint Township			
Function:	Allows for full use of the 4.0 MGAL Standpipe			
Adequate Security?				
Pump Number	1	2		
Year Installed	2001	2001		
Type	Hor Centr	Hor Centr		
Permit Capacity	1.0 MGD	1.0 MGD		
Permit TDH	140 FT	140 FT		
Current Capacity	1.08 MGD	1.08 MGD		
Current TDH				
Basis	estimate	estimate		
HP	40	40		
Last Complete Inspection	2011* A	2011*		
Last Efficiency Test	2001	2001		
Control Signal Type	radio	radio		
Controls Adequate?	yes	yes		
Operator Visit Frequency				

Comments:

The Noble Street pumping station was constructed in 2001 and allows for full use of the adjacent 4.0 MGAL standpipe and functions as **Secondary** pumping station. The pump station increases the hydraulic grade line to the Beecher Road tank and reduces the peak demand. A flow-control valve is used to control the flow into and from the standpipe. The SCADA system continues to provide average and max day pumpage data from this pump station

The pumps and appurtenances are greased and maintained several times per year. The pumps and appurtenances appear to be in good condition and overall housekeeping is acceptable.

The Noble Street standpipe was inspected by Dixon in 2011 and components of the pump station (piping, pump/motor) were visually inspected and found to be in good condition.

AUXILIARY POWER - None

Power Type		Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)	2.16	mgd	
Firm Pump Capacity (gpm)	1.08	mgd	
Auxiliary Power Capacity (gpm)	n/a	mgd	
Max Day Demand @ this location	1.74	mgd	(2009-2013)
Peak Hour @ this location		gpm	(Hydropneumatic Stations)
Avg Day Demand @ this location	0.31	mgd	(2011 - 2013 avg.)
Firm Pump Capacity/Max Day	62	%	
Peak Hour/Firm Pumping Capacity		%	(Hydropneumatic Stations)
Aux. Power Capacity/Avg Day	n/a	%	

Comments:

DISTRIBUTION

Pump Stations - Houran Street

Location: Houran Street near Beecher Road
Function: peaking facility during high demand periods
Adequate Security?

Pump Number	1	2	3	4	5
Year Installed	1970	1970	1970	1970	1970
Type	Hor Centr	Hor Centr	Hor Centr	Hor Centr	Hor Centr
Permit Capacity	3.0 MGD	2.0 MGD	2.0 MGD	3.0 MGD	3.0 MGD
Permit TDH					
Current Capacity	3.0 MGD	2.0 MGD	2.0 MGD	3.0 MGD	3.0 MGD
Current TDH	200 ft	225 ft	225 ft	225 ft	225
Basis	estimate	estimate	estimate	estimate	estimate
HP	125	125	125	150	150
Last Complete Inspection	2004	2004	2004	2004	2004
Last Efficiency Test					
Control Signal Type	radio	radio	radio	radio	radio
Controls Adequate?	yes	yes	yes	yes	yes
Operator Visit Frequency					

Comments:

The Houran Street station's main mode of operation is to pump from the existing ground storage tanks to the 2-Mgal elevated tank which basically "floats" on the system and functions as a **Secondary** pumping station The station can also pump water directly to the distribution system; however, this mode of operation is not practiced. The station can also receive water from the city of Flint as an emergency supply through the Donaldson Road connection.

During low demand (nighttime), water refills the ground storage reservoirs immediately upstream of the station through a 12-inch main from the county. The station, including the ground storage reservoirs, are typically taken out of service during the winter months.

Overall housekeeping at this facility remains acceptable. All five pumps are maintained including routine greasing of the pump and motor bearings. Security cameras have been provided at the pump station.

AUXILIARY POWER

Power Type	none	Power Rating (kWh)	
Fuel Type	n/a	Starting Frequency	
Capacity (gpm)	na/	Load Testing Frequency	

Total Pump Capacity (gpm)		13	mgd
Firm Pump Capacity (gpm)		10	mgd
Auxiliary Power Capacity (gpm)			mgd
Max Day Demand @ this location		varies	mgd
Peak Hour @ this location			gpm (Hydropneumatic Stations)
Avg Day Demand @ this location		varies (approx	mgd
Firm Pump Capacity/Max Day			%
Peak Hour/Firm Pumping Capacity			% (Hydropneumatic Stations)
Aux. Power Capacity/Avg Day			%

Comments:

DISTRIBUTION

Pump Stations - Vassar Road

	Location:	Vassar Road, Grand Blanc Township		
	Function:	Boosts pressure to SE Grand Blanc Township		
	Adequate Security?			
Pump Number	1	2	3	
Year Installed	2001	2001	2005	
Type	Hor Centr	Hor Centr	Hor Centr	
Permit Capacity	1.4 MGD	0.7 MGD	1.4 MGD	
Permit TDH	275 ft	275 ft	275 ft	
Current Capacity	1.4 MGD	0.7 MGD	1.4 MGD	
Current TDH				
Basis	estimate	estimate	estimate	
HP	125	125	125	
Last Complete Inspection	New in 2001	New in 2001	New in 2005	
Last Efficiency Test	2001	2001	2005	
Control Signal Type				
Controls Adequate?				
Operator Visit Frequency				

Comments:

The Vassar Road pumping station was constructed in 2002 and functions as a **Secondary** pumping station. This station pumps water from the Vassar Road ground storage tank located adjacent to the pump station to the High Pressure Zone - Baldwin Road tank (1,150 Ft - HGL) in the SE portion of Grand Blanc Township. The water level in the tank is controlled by an altitude valve and flow from the station is controlled by a flow control valve and an upstream pressure sustaining valve. A third pump was added to the station in 2005. All three pumps are VFD controlled. Security cameras were recently installed.

AUXILIARY POWER

Power Type	Portable	Power Rating (kWh)	206 KVA
Fuel Type	diesel	Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)	3.5	mgd
Firm Pump Capacity (gpm)	2.1	mgd
Auxiliary Power Capacity (gpm)	n/a	mgd
Max Day Demand @ this location	n/a	mgd
Peak Hour @ this location		gpm
Avg Day Demand @ this location	n/a	mgd
Firm Pump Capacity/Max Day	n/a	%
Peak Hour/Firm Pumping Capacity		%
Aux. Power Capacity/Avg Day	n/a	%

Comments:

A portable stand-by power generator is provided and consists of a 206 KVA trailer mounted generator that utilizes diesel fuel. The generator has automatic switch-over and lightning surge protection. The generator starts automatically on a weekly basis under no load.

DISTRIBUTION

Pump Stations - Fenton Road

Location: Fenton Road just south of I-75
Function: Boost pressure to 1,050 ft HGL - South Pressure Zone
Adequate Security? _____

Pump Number	1	2
Year Installed	1996	1996
Type	Hor Centr	Hor Centr
Permit Capacity	1140 GPM	1140 GPM
Permit TDH	212 ft	212 ft
Current Capacity	NA	NA
Current TDH	NA	NA
Basis		
HP	100	100
Last Complete Inspection	NA	NA
Last Efficiency Test	NA	NA
Control Signal Type		
Controls Adequate?		
Operator Visit Frequency		

Comments:

The Fenton Road pumping station boosts pressure in conjunction with Grand Blanc Twp's Embury Road pump station to the South Pressure Zone (1,050 ft - HGL) and is a Secondary pumping station. The Fenton Road station operates in the lead position during the summer months and as a back-up (lag position) to the Embury Road station during the winter months.

AUXILIARY POWER			
Power Type	2nd substation	Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)	2280	3.28	mgd
Firm Pump Capacity (gpm)	1140	1.64	mgd
Auxiliary Power Capacity (gpm)	2280	3.28	mgd

Max Day Demand @ this location	not monitored	mgd
Peak Hour @ this location		gpm
Avg Day Demand @ this location	not monitored	mgd
Firm Pump Capacity/Max Day		%
Peak Hour/Firm Pumping Capacity		%
Aux. Power Capacity/Avg Day		%

Comments:

A secondary electrical feed from a different substation provides electrical redundancy at this station.

DISTRIBUTION

Pump Stations

Location: Orgould Avenue north of Pierson Road
Function: None
Adequate Security? _____

Pump Number	1	2	3	4
Year Installed	1974	1974	1974	1974
Type	Hor Centr	Hor Centr	Hor Centr	Hor Centr
Permit Capacity				
Permit TDH				
Current Capacity	1050 GPM	1050 GPM	1000 GPM	1000 GPM
Current TDH	200 ft	200 ft	200 ft	200 ft
Basis	estimate	estimate	estimate	estimate
HP	100	100	100	100
Last Complete Inspection	n/a	n/a	n/a	n/a
Last Efficiency Test	n/a	n/a	n/a	n/a
Control Signal Type				
Controls Adequate?				
Operator Visit Frequency				

Comments:

This pumping station remains out of service and there are no plans to bring this facility back into operation. All of the pumps are electrically locked out and the dead piping between the station and the discharge

AUXILIARY POWER

Power Type		Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)		mgd
Firm Pump Capacity (gpm)		mgd
Auxiliary Power Capacity (gpm)		mgd
Max Day Demand @ this location		mgd
Peak Hour @ this location		gpm
Avg Day Demand @ this location		mgd
Firm Pump Capacity/Max Day		%
Peak Hour/Firm Pumping Capacity		%
Aux. Power Capacity/Avg Day		%

Comments:

DISTRIBUTION

Pump Stations

Location:	Clio Road north of Coldwater Road			
Function:	None			
Adequate Security?				
Pump Number	1	2		
Year Installed	1984	1984		
Type	Hor Centr	Hor Centr		
Permit Capacity				
Permit TDH				
Current Capacity	600 GPM	600 GPM		
Current TDH	92 ft	92 ft		
Basis	estimate	estimate		
HP	20	20		
Last Complete Inspection	n/a	n/a		
Last Efficiency Test	n/a	n/a		
Control Signal Type				
Controls Adequate?				
Operator Visit Frequency				

Comments:

This pumping station remains out of service and there are no plans to bring this facility back into operation. All of the pumps are electrically locked out and the dead piping between the station and the

AUXILIARY POWER

Power Type		Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)		mgd
Firm Pump Capacity (gpm)		mgd
Auxiliary Power Capacity (gpm)		mgd
Max Day Demand @ this location		mgd
Peak Hour @ this location		gpm
Avg Day Demand @ this location		mgd
Firm Pump Capacity/Max Day		%
Peak Hour/Firm Pumping Capacity		%
Aux. Power Capacity/Avg Day		%

Comments:

DISTRIBUTION

Pump Stations

	Location:	Van Slyke Road north of Bristol Road	
	Function:	None	
	Adequate Security?		
Pump Number	1	2	
Year Installed	1984	1984	
Type	Hor Centr	Hor Centr	
Permit Capacity			
Permit TDH			
Current Capacity	600 GPM	600 GPM	
Current TDH	92 ft	92 ft	
Basis	estimate	estimate	
HP	30	30	
Last Complete Inspection	n/a	n/a	
Last Efficiency Test	n/a	n/a	
Control Signal Type			
Controls Adequate?			
Operator Visit Frequency			
Comments:			

This pumping station remains out of service and there are no plans to bring this facility back into operation. All of the pumps have been electrically locked out. System pressures can be monitored from this location.

AUXILIARY POWER

Power Type		Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	
Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd
Max Day Demand @ this location			mgd
Peak Hour @ this location			gpm
Avg Day Demand @ this location			mgd
Firm Pump Capacity/Max Day			%
Peak Hour/Firm Pumping Capacity			%
Aux. Power Capacity/Avg Day			%
Comments:			

DISTRIBUTION

Pump Stations

Location:	NE intersection of Pierson & Elms Road			
Function:	PRV and metering station for the city of Flushing			
Adequate Security?				
Pump Number	1	2		
Year Installed	?	?		
Type	Hor Centr	Hor Centr		
Permit Capacity				
Permit TDH				
Current Capacity	700 GPD	1050 GPM		
Current TDH	?	?		
Basis	estimate	estimate		
HP	40	50		
Last Complete Inspection	n/a	n/a		
Last Efficiency Test	n/a	n/a		
Control Signal Type				
Controls Adequate?				
Operator Visit Frequency				

Comments:

This pumping station originally took suction from the adjacent 0.5 Mgal reservoir and was designed to fill the city of Flushing's elevated tank. The facility was modified when Center Road went on line and now acts as a pressure reducing station. One of three original pumps was removed and replaced with a pressure reducing valve and that serves the city of Flushing. The existing pumps are electrically locked out. Power is supplied to the building for lighting and heat.

AUXILIARY POWER

Power Type		Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)		mgd
Firm Pump Capacity (gpm)		mgd
Auxiliary Power Capacity (gpm)		mgd
Max Day Demand @ this location		mgd
Peak Hour @ this location		gpm
Avg Day Demand @ this location		mgd
Firm Pump Capacity/Max Day		%
Peak Hour/Firm Pumping Capacity		%
Aux. Power Capacity/Avg Day		%

Comments:

Conclusions and Recommendations - Pumping Stations

The WWSD has ten booster pumping stations available for use. Six of these stations (CRN, CRS, Henderson Road, Houran Street, Vassar Road and Noble Street) are operated on a routine basis. The remaining stations (Orgould, Clio, Van Slyke, and City of Flushing) are either out of service or function as a pressure reducing/monitoring station.

The Henderson Road and Center Road pumping stations along with their associated storage facilities obtain water directly from the 72-inch transmission main and are Genesee County's Primary pumping facilities. The remaining active pump stations function as Secondary pumping facilities since they receive water from one of the Primary pumping stations.

The WWSD has maintained their pumping stations in a good state of repair and we are pleased with the preventative maintenance and overall level of housekeeping at these facilities.

Water usage needs to be monitored and reported on the MOR for the Vassar Road and Fenton Road stations (Secondary pumping station). Water usage at the Houran Street station also needs to be estimated and reported on the MOR; however, the WWSD is encouraged to provide metering at the Houran Street station in order to obtain more accurate water use data. These stations play an active role in the level of service to the southern and western portions of Genesee County and accurate water usage is an important operational parameter to monitor.

WWSD staff operate the chlorination equipment (gas chlorination at Henderson Road) during the late summer months (Aug - early Sept) in order to maintain adequate chlorine residuals in the western portion of the county's service area. Details pertaining to chlorination also need to be reported in the MOR during the months that the equipment is in service (see Conclusions and Recommendations - MORs).

DISTRIBUTION

Hydrants			
Number of Hydrants	3083		
Number Without Auxiliary Shut-Off Valves	*		
Number that are Self-Draining	*		
Number of Inoperable Hydrants	*		
Frequency of Hydrant inspection:	1/year (fall)		
Inspection Staff:	WWSD oper.		
Are there areas where additional hydrants are needed?	No		
If yes, list locations:			
Hydrant location system	Yes	Accurate?	Yes
Are hydrants color coded for capacity?	Yes (main size)		
Has this information been provided to the fire department?	Yes (main size)		
Frequency and seasons of hydrant flushing	1 per year		
Purpose of flushing	aesthetics, hydrant operation		
Is the public notified prior to flushing?	No		
Does flushing follow a specific format?	Completed by township		
Is the volume of water used during flushing estimated?	Yes		
Do hydrants receive maintenance painting?	yes		
Is a record maintained of hydrant activities?	yes		
Comments:			

* An exact number of inoperable hydrants cannot be ascertained since this number changes on a weekly basis. Inoperable hydrants are bagged until they are repaired. WWSD staff repair broken hydrants upon discovery (typically 1-2 per week). WWSD staff obtains authorization from the townships (Flint & Flushing) that maintain their own hydrants prior to completing any repairs. Hydrant inspections are completed each fall and work orders are prepared and completed on any inoperable hydrants that are discovered.

The WWSD maintains a list of hydrant information. The list provides information for each hydrant including: location, color coding, winterizing, work order information, etc. Hydrant records are also maintained in a work-order database by attaching completed work orders as a layer in WWSD's Utility GIS program. Also, all auxiliary shut-off valves are depicted by exact location and stored in a 3-ring binder.

Valves (excluding hydrant shut-offs)	
Number of Valves	4668

The WWSD has made some progress towards initiating a valve turning program. Valves along the South Loop transmission line (31 valves) have been exercised. A portion of the valves along the North Loop have been turned; however, this work remains in progress. Valve turning is also performed in locations at or near water system projects and in areas experiencing more frequent watermain breaks.

A valve log book is also in place that contains valve records. Valve locations are depicted by witness points and are entered into the work-order database. All valve records are also entered into WWSD's Utility GIS program.

Conclusions and Recommendations: Operation/Maintenance (O&M)

WWS continues to maintain an active O&M program. The status of specific O&M programs are discussed in more detail below:

Hydrants/Flushing

The WWSD maintains approximately 3,100 hydrants. Hydrant records including: location, color codes, and operational and maintenance history appear to be adequate and these records are maintained in a work-order database.

Retail customers continue to pay the WWSD a $35.00 charge per hydrant on an annual basis for routine maintenance and flushing. Flint and Flushing townships however, continue to operate and maintain hydrants within their jurisdiction in order to reduce their O&M costs to the County. The township's O&M responsibilities include flushing and winterizing hydrants and these activities are performed by the local fire departments. The WWSD continues to provide annual training for fire department staff on hydrant operation and maintenance. We recommend that the WWSD continues this type of on-going training as it appears to have improved hydrant operation and maintenance within these townships.

Valves

The WWSD maintains approximately 4,700 valves with adequate recordkeeping. We encourage the WWSD to continues working towards establishing a system-wide valve-turning program. This includes operating the remaining isolation valves along the North Loop and establishing a systematic approach for operating all valves. One approach we discussed is to break down county's entire service area into quadrants and operate critical valves on a yearly basis within a specified quadrant; thus operating all of the WWSD's critical valves at least once every four to five years. A review of all valves should be performed and a determination made as to which valves are most critical and the percentage of these valves that can be operated each year.

DISTRIBUTION

Customer Service Information

Number of service connections	21,037 retail, 45,137 total accounts (retail & wholesale)
Number of metered service connections	same

Percentage of service line materials:	
Copper	100%
PVC/PE/PB	
Galvanized	
Lead	

Ownership of Service (CWS/Customer)	
From Corp Stop to Curb Stop	
From Curb Stop to Property Line	
From Property Line to Meter	
Meter	

CUSTOMER METERS - INFO NEEDED from GCDC

Types of meters Used	
Number of Meters with Remote Reading Devices	
Residential Meter Sizes	
Industrial/Commercial Meter Sizes	
Meter Testing/Maintenance Program	
Average Age of Meter in System	
Criteria for Changeout	
Number or Percent Changeout per Year	
Master Meter Locations	See Distribution Tab
Calibration of Master Meters	GCDC
Meter Reading Staff/Contract:	GCDC

Percent of Usage by Customer Type	
% Residential	75%
% Commercial	25%
% Industrial	
% Other	

Large Users	% of Use

Comments:

Approximately 95% of the existing compound meters were replaced with new turbine meters at all industrial and mobile home park accounts. A testing program remains in place for these new meters. The testing program is contracted out to a third party (Michigan Meter).

A few Neptune meters remain in a small residential area. Although, the WWSD does not have a change-out program in place for residential accounts, these remaining meters are expected to be replaced as the WWSD pursues a system-wide upgrade of its metering system to a fixed-base network radio-read system (2014 DWRF Project Plan). The WWSD is certifying received bids for the meter system upgrade and will likely move forward with the project.

WWSD has upgraded to radio read technology for large customers.

Conclusions and Recommendations - Program Meter Change-Out

The WWSD is pursuing a system-wide upgrade of its metering system to a fixed-base radio read system. Bids are being received for the upgrade and work is expected to proceed in 2015. We encourage the WWSD to complete the upgrade radio read technology as it will significantly reduce the time required to conduct routine meter reading. Radio read technology will also help in early detection of significant leaks and improve customer service.

System Growth

Year	# of Construction Permits Issued	Permitted Amount of WM Feet	Number of Retail Customers
2004	1		
2005	6	13829	18,881
2006	2	130	20,092
2007	6	8942	20,621
2008	8	20194	NA
2009	6	12344	NA
2010	7	10088	NA
2011	4	1360	20,739
2012	5	1845	NA
2013	2	6	NA
2014	3	731	21,037

Comments:

DISTRIBUTION

Water Rates	
What is your current rate schedule?	$4.45/100 cu.Ft
Are current rates adequate to support O&M and CIPS?	yes
When was last time rates were adjusted?	10/2/2014
Has a water rate study been performed? When?	Yes, Jones & Henry - 2014
Is there a meter charge or ready to serve charge?	yes
Is a copy of the water rate schedule and ordinance available?	yes - see App. B

Comments:
Each retail township is responsible for billing and establishing their own tap-in fee. In addition to each retail customer's tap-in fee, Genesee County charges a Capital Improvement Fee of $1000 per unit based upon the REU determined for the specific connection.

GCDC and the DWSD have not established a water service contact; however, GCDC pays a "non-contract" customer rate which incurs an 11% surcharge. GCDC is the contract holder and is treated the same as all other customers.

Extra Mains (Sections for Each Size in Service)	yes - 6" - 48" & 72"
Repair Clamps (2 or more for each size)	yes - 3" - 48"
Tees, Crosses & Elbows	local supply yard
Hydrants	6 TC
Valves	4" - 12" - 1 each
Services (Corp & Curb Stops, Clamps and Lines)	3/4" - 2"
Other	

Comments:

Safety Programs	
Confined Space Entry Program	
Trench Safety Program	

Comments:

PROGRAM COMPLIANCE

Cross Connection Programs

Ordinance No:	73-1	Date:	3/1/1973		
Approved Program (Y/N)?	Yes	Date:	7/19/1973		
Staff Assigned to Program, (No., Dept. and/or who)			Hydro-Design, Inc. (HDI)		
Is Annual Cross Connection report required (Y/N)?			Yes		
Was previous year's annual report received (Y/N)?			yes	Date:	1/23/2014
Was previous year's annual report acceptable (Y/N)?			yes		
Inspection Status:	Satisfactory				
Assembly Testing Frequency:		High Hazard:	86	Low Hazard:	3307
Assembly Testing Performance	sufficient testing				
Recordkeeping:					
Private Well Isolation/Abandonment Procedure:					

Comments:

HDI continues to perform routine inspections for Genesee County and has maintained adequate implementation of their cross connection control program (CCCP). HDI maintains approx. 3300 low hazard accounts and approximately 660 of these accounts are re-inspected on an annual basis. 86 high hazard inspections were required in 2013 and 96 inspections were completed. HDI met all re-inspection requirements during the 2011-2013 time period.

Device testing is also being verified as required (approx. 1250 testable devices). Paul Patterson is the operator from HDI who is responsible for implementing Genesee County's CCCP.

Conclusions and Recommendations - Cross Connection Control

Hydro-Design, Inc. (HDI) continues to implement the WWSD's Cross Connection Control Program (CCCP). Approximately 3,400 accounts remain eligible for a routine inspection and this number has held steady since 2008. Previous site visits with HDI and WWSD staff continue to show that adequate cross connection control records are in place and devise testing is being verified. Also, our review and discussion of WWSD's most recent cross connection reports confirms adequate implementation of the program. The WWSD continues to maintain a contract for services with HDI. We continue to support WWSD's commitment towards maintaining an adequate CCCP.

Annual Pumpage Reports

Is Annual Pumpage Report required (Y/N)?	Yes		
Was previous year's annual report received (Y/N)?	Yes	Date:	4/2/2014

Comments:

The annual pumpage report is based on the county's total water purchased from the DWSD. This amount is slightly higher than the total pumpage obtained from SCADA (compiled in the MOR) since a portion of the county's service area is directly connected to the 72-inch transmission main (master meter connection wo. pump station).

Conclusions and Recommendations - Annual Pumpage Reports

The annual pumpage report needs to be modified to report the ADD for the combined wholesale and retail usage. Also, the maximum day demand needs to be reported.

Monthly Operator Reports

Are Monthly Operation Reports required (Y/N)?	Yes		
Were all previous year's reports received (Y/N)?	Yes	Timely?	yes
Are previous year's reports acceptable (Y/N)?	See comments		

If no, describe problems:

Comments:

Genesee County's MOR format was revised in 2008 to include pumpage data from each of the Primary pumping stations and storage facilities. Bacteriological sample results and chlorine residuals are also included in the report.

Conclusions and Recommendations - Monthly Operation Reports (MORs)

The WWSD continues to report water use through each of its Primary and Secondary pumping stations. Chlorine residual monitoring and bacteriological monitoring results are also included in the report.

The reported pumpage in the MOR needs to be broken down into Primary pumping stations and Secondary pumping stations. The Vassar Road and Fenton Road stations needs to be included in the MOR as Secondary pumping stations. Estimated pumpage from the Houran Street station needs to be added to the MOR; however, the WWSD is encouraged to add metering at the Houran Street station.

Chlorine application also needs to be added to the MOR since the gas-feed system at the Henderson Road pumping station is used during the late summer months. A Class-D MOR template containing the required chemical feed parameters for chlorination was provided to the WWSD and this template can be used for reporting the chemical feed information in the MOR.

Consumer Confidence Reports

Is the annual CCR required? (Y/N)	yes		
Was the previous year's report received? (Y/N)	yes	Date:	7/7/2014
Was the previous year's acceptable? (Y/N)	yes		
Was the previous year's certification form received? (Y/N)	yes	Date:	7/7/2014

Comments:

Emergency Response Plan

Date of ERP	2008 Contingency Plan	Acceptable?	No
Filed where?	GCDC *		
Comments:			

Genesee County's 2008 water system contingency plan addresses potential water system emergencies (large main breaks, pump station failures, loss of water service (limited areas), power outages, contamination, etc.) ; however, an Emergency Response Plan (ERP) that also outlines mitigation of an interruption in the county's source of water is not in place.

Conclusions and Recommendations - Emergency Response Plan/Source Reliability

The WWSD needs to prepare a water system Emergency Response Plan (ERP) and can be based off the county's 2008 water system Contingency Plan. The ERP calls for additional information (utility plans, agreements, mutual aid) that needs to be included.

The ERP also needs to discuss short-term source reliability (present day - early 2016) in the event of an interruption of water service from the DWSD. Genesee County informed us in a letter dated August 15, 2011 that the WWSD negotiated a revision to the water service contract with the City of Flint to provide up to 5.4 MGD of emergency service to Genesee County from its renovated WTP; however, we have not received a copy of the revised contract. Also, given that the city of Flint fully utilizes their WTP, is this level of emergency service still available from the city and how will it be conveyed to the county's transmission system? Although it is understood that a combination of back-up wells and utilization of the Flint WTP can provide some level of service for short-term reliability, the protocol for implementing these emergency measures including level of service and conveyance to the county's system needs to be discussed in the ERP.

The WWSD continues to work towards identifying the best solution for long-term source reliability. Critical factors that need to be evaluated towards this effort include; sizing of the raw water storage reservoir, level of service from the Flint WTP, finished storage capacity in excess of normal system requirements, and stand-by well capacity . As a minimum starting point, the WWSD needs to plan for a minimum of 10 days of raw water storage (based on projected future average day). GCDC's ERP will need to be revised in 2016 to include discussion of long-term source reliability.

PROGRAM COMPLIANCE

General Plan

Date of Most Recent Plan	2012		
Filed Where?	DEQ & GCDC	Acceptable?	Yes
	General Layout	yes	
	Facility locations & capacities	locations depicted	
	Water Main Inventory	not on trans. plan	
	Identification of Service Areas	yes	
	Hydraulic Analysis	in RS	
	Capital Improvement Plan	see comments	

Comments:

A copy of Genesee County's transmission main plan (2011 update) has been provided to the DEQ. The transmission main plan shows the size and location of all 12-inch transmission mains and larger, pumping stations, storage facilities, meter pits, and pressure districts. Genesee County also maintains updated distribution system records Utility GIS. Smaller areas of the distribution system including hydrants, valves, and watermains can be printed from Utility GIS for daily use as needed.

Conclusions and Recommendations - General Plan

Genesee County's water system GP will need to be updated by January 1, 2016. The following items will need to be included in the updated GP:

General layout of the entire waterworks system, including distribution system piping and the location of valves, hydrants, storage tanks, and master meter connections. All improvements prior to 2016 should be included in the general layout.

A hydraulic analysis of the distribution system showing pressure contours under peak demands and inventory of watermain by size, material, and age. The hydraulic model used in the RS can be used for the GP provided that the model is updated to reflect any recent water distribution system improvements.

Service area map including existing and future service area boundaries.

WSCIP for the 5-year and 20-year planning periods. The recommended projects from most recent RS can be used to complete this objective. Enclosed is a list of items for consideration when preparing the WSCIP.

Much of this work can be completed concurrently with the revision of the water system RS.

Reliability Study

Date of Most Recent Study:	2011	
Filed Where?		Acceptable?
Contents:	5 & 20 Year Demand Projections	yes
	Source Production Totals (Monthly)	yes
	Customer Supply Usage (Annual)	yes
	Res/Comm/Ind Usage (Annual)	
	Water Shortage Response Plan	no
	Recommended Improvements	yes

Comments:

Genesee County utilized CTE to prepare the North Loop-Phase III study and to make subsequent updates. The original study conducted in 2000 was updated in 2005. The hydraulic model used in the 2005 study was updated in 2011 to revise pressure district boundaries as needed. The model also evaluated the need for further pressure reducing valves and transmission system improvements. An updated Master Plan (map), based upon the revised model, was provided to us.

Conclusions and Recommendations - Reliability Study

Genesee County's RS needs to be updated by 2016 as required to meet the 5-year revision requirement in the MSDWA. The revised RS will serve as an opportunity for the WSSD to update their GP (discussed above) given the overlapping elements between the RS and GP. A list of items that are required in the RS is included with the survey letter.

Permits

Applies for and obtains permits prior to construction (Y/N):	yes	
Reviews plans prior to submittal to DEQ (Y/N):	yes	
Standard specifications on file at CWS (Y/N):	yes	
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):	yes	Date:
Follows master plan for any construction (Y/N):	yes	
Develops as-built plans (Y/N):	yes	
Updates general plans (Y/N):	yes	

Comments:

PROGRAM COMPLIANCE

Capacity Development

	Submitted	Acceptable
Technical Capacity		
Site and/or general plan		
System reliability addressed-dual feeds, standby power, storage		
Purchase agreement		
Financial Capacity		
Acknowledgement of annual fee		
Annual budget plan for next 5 years		
Sources of revenues (rates, fees, etc.)		
Planned expenses (O&M, administrative, engineering, accounting debt service)		
Capital improvements costs/account & plans		
Capital replacement account and plans		
Documentation of acceptance repayment plans from lending and bond authorities		
Managerial Capacity		
Chain of command and clear lines of responsibility		
Sample site plans		
Acknowledgement of monitoring costs		
Cross connection control program		
Standard Specifications		
Plans/Methods for providing legal doctrine (ordinances, policies, plans)		
Customer complaint handling format		
Operator training program		

Comments:

MONITORING

Bacteriological

Date of Approved Site Sampling Plan:	2/15/2008		
Number of samples required each month:	80	Basis:	population
Certified Lab Used:	ARTP WWTP Lab		
MCL, Monitoring or Reporting Violation(s) in past 3 years? (Y/N)	no	Date:	
Number & Type of Violations	na		
Public Notice Issued according to regulations? (Y/N)	na	Date:	

Comments:

The WWSD's sample site plan was prepared in February 2008 and reflected a service population of 70,500.

Conclusions and Recommendations - Bacteriological Monitoring

The WSSD continues to maintain an excellent sampling history as part of their monthly bacteriological monitoring program. Specifically, eleven samples are collected twice a week from eleven routine sampling locations in accordance to the sampling site plan (2008 revision). This sampling protocol results in 88 to 110 samples being collected each month (based on the minimum requirement of 80 samples per month).

The minimum number of required distribution system samples remains at 80 samples per month and is based on a retail service area population of approximately 71,500.

The WSSD's 2008 bacteriological sampling site plan; however, needs to be updated to reflect minor changes in sampling locations and updated system contacts. A bacteriological sampling site plan template was provided the WWSD and this template can be used for preparing the updated plan. A copy of the updated plan also needs to be sent to us for our records

Chemical

Date of Monitoring Schedule:	February 2014		
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)	yes		
If nitrate detect, what is concentration?		Date:	
If nitrite detect, what is concentration?		Date:	
Detects for metals > 50% of MCL? (Y/N)	none		
Metals (list)		Date:	
		Date:	
Detects for VOCs (Y/N)	no	Date:	
Detects for SOCs (Y/N)	no	Date:	
Date of Approved Disinfection Byproduct Monitoring Plan:	4/5/2012		

Comments:

Lead and Copper Monitoring

No. of Samples Required:	14		
Frequency (Semi Annual/Annual/Triennial)	triennial		
Exceedance of lead or copper action level (Y/N)	no		
If yes, was public education issued? (Y/N)	na	Date:	
Next Monitoring Period:	see comments		
Corrosion Control Program Status, if applicable	na		
Lead service line replacement status, if applicable	na		

Comments:

The WWSD continues to implement their lead and copper program adequately. Both action levels were met in all of the applicable rounds of lead and copper monitoring with the most recent round of monitoring being completed during the summer of 2014. The next round of samples will need to be collected following start-up of the new WTP (anticipated in early 2016). Since this will represent a change in the source of water, GCDC will be required to resume full chart PB & CU monitoring. The change in the Lead & Copper program will be discussed in more detail when the completion date of the WTP is determined.

Radiological Monitoring - not required

TREATMENT

Disinfection

Point of Treatment (Wellhouse Name)		Henderson Rd PS	Injection Point:	Storage tank infl, pump disch.
DWIS Facility ID (Site Code)				
Year Initiated		2006	Purpose:	boost CL2 in late summer
Product		CL2 gas	Manufacturer:	
Chemical Strength		100%	Dilution:	
ANSI/NSF Standard 60 Approval? (Y/N)		yes	NSF max dose:	mg/L
Normal Feed Rate/Dosage		see comments	mg/L	
Avg Plant Tap Residual (mg/L)	total:	see comments	free:	
Avg Distribution Residual (mg/L)	total:	see comments	free:	
Frequency of Residual testing	Plant Tap:	see comments	Distribution:	
Analytical Method Used			Instrument:	
Any Overfeed Instances? (Y/N)		no	Date(s):	
Any Low Feed Instances? (Y/N)		no	Date(s):	
Pump Type:		W&T vac. soln feed	Model:	
Number of Pumps:		2		
Pump Capacity	Lbs/d max:	500	gpd min:	
	psi:			
Chemical Storage Tank Type		Two 150# cylinders	Volume:	
Weight/Level Reading Method		Digital scale		

SAFETY

Separate Room	yes	Cylinder Repair Kit	yes
Exhaust fan	yes	inator or repair kit	
Fresh Air Vent	yes	Ammonia Bottle	
Door Opens Out With Panic Bar	yes	Self Contained Air Packs	
More than 1500 # Cl_2 onsite	no	Training Programs	
Electrical Protected from Gas?		Shower/Eye Wash	

Comments:
The Henderson Rd PS is equipped with gas chlorination and is used for emergency purposes and during the late summer months (usually Aug-Sept) if chlorine residuals are low in the western portions of the county (Flushing vicinity). Additional information concerning the gas feed system is provided on the Pumping Station page.

Phosphate Addition - Not applied

Closing Remarks

The following is a list of items discussed in this report which must be addressed by the County. No priority is implied by the order.

As always, we are available to meet with you to discuss these concerns and their priority on more detail.

1. Prepare a water system Emergency Response Plan for Genesee County and include measures that provide adequate short-term source reliability.

2. Update the water system Reliability Study and General Plan concurrently by January 1, 2016.

3. Schedule tank inspections for Vassar and Fenton Road tanks and the Houran Street tanks.

4. Expand the scope of the valve turning program.

5. Update the 2008 Bacteriological Sampling Site Plan.

6. Modify the Annual Pumpage Report to show the ADD and MDD for the entire water service area,

7. Raze the de-commissioned pumping/storage facilities.

8. Modify the monthly operation report include pumpage from all pumping stations. Re-designate pumping stations as primary or secondary and report chlorine operating parameters.

9. Establish a water service contract with the DWSD.

2740

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

January 23, 2015

Mr. Matt Wurtz, DPW Director
City of Grand Blanc
203 Grand Blanc Road
P.O. Box 846
Grand Blanc, Michigan 48439

WSSN: 02740

Dear Mr. Wurtz

SUBJECT: City of Grand Blanc - Water System Sanitary Survey

This letter will confirm my visit with you and Mr. Mike Blom on December 18, 2014, and summarize the subsequent review and discussion of the water supply facilities serving the city of Grand Blanc. The purpose of the visit was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). In addition, the enclosed Water System Review form was updated to gather information on the city of Grand Blanc water supply system.

The survey noted that the city will proceed with water system improvements in 2015 as part of the Drinking Water Revolving Loan Fund (DWRF) project – DWRF Project No. 7387-01. Specific improvements include watermain replacement and elimination of dead-ends in several residential areas, replacement of iron-removal filter media at Water Treatment Plant (WTP) 7 and WTP 5 & 8. New pumps and motors with variable frequency drive control will also be installed in Wells 5 and 8. The project also includes upgrading the city's metering system to a fixed base radio read system and recoating the 0.5 million gallon elevated storage tank. Completion of the work will improve the level of service to residents and will also allow the city to maintain a high standard of water quality.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	No deficiencies/recommendations
Treatment	No deficiencies/recommendations
Distribution System	**Recommendations made**
Finished Water Storage	**Recommendation made**
Pumps	No deficiencies/recommendations
Monitoring & Reporting	No deficiencies/recommendations

Management & Operations	**Recommendation made**
Operator Compliance	No deficiencies/recommendations
Security	No deficiencies/recommendations
Financial	No deficiencies/recommendations
Other	No deficiencies/recommendations

It is hoped that the following recommendations will prove useful in enhancing the operation and maintenance of your water supply.

1. Recoat the Saginaw Road elevated tank within the next several years based upon the conclusions and recommendations presented in the most recent tank inspection report. Replacement of the tank's epoxy coating system will help to increase the useful service life of the elevated tank.

2. Update the city's water system General Plan (GP) by January 1, 2016, to meet the changes made to Act 399 in 2009. The changes place new or modified requirements on water systems as of January 1, 2016, that includes the need to update the water system GP. The following information needs to be included in the updated GP.

   - General layout of the entire waterworks system, including distribution system piping and the location of valves, hydrants, storage tanks, and source(s) of supply. All improvements prior to 2016 should be included in the general layout.
   - A hydraulic analysis of the distribution system showing pressure contours under peak demands and inventory of watermain by size, material, and age. The hydraulic model used in the 2011 Reliability Study (RS) can be used for the GP. The hydraulic model will need to be updated to account for distribution system improvements completed prior to 2016.
   - Service area map including existing and future service area boundaries.
   - Water System Capital Improvements Program (WSCIP) for the 5-year and 20-year planning periods. The recommended projects from the most recent RS could be used as the basis for establishing the WSCIP. Enclosed is a list of items for consideration when preparing the WSCIP.

3. Update the 2011 water system RS in conjunction with updating the GP. Water system RSs need to be updated once every five years unless waived by our department. The city may be eligible to have this requirement waived if supporting documentation from your consultant is provided that confirms no significant changes in water system source capacity, hydraulics, projected demands, and 5-year and 20 year needs. The work needed to update the GP may provide the opportunity to obtain the information needed for the supporting documentation if the city wishes to have this requirement waived.

4. Institute a valve turning program for distribution system isolation valves. Given the size of the distribution system, a valve turning program (by sections) should be instituted such that all valves are operated once every to four to five years. We encourage the city to work towards implementing a valve turning program as it will help keep isolation valves in good operating condition.

Please submit a letter by *February 28, 2015,* that outlines the city of Grand Blanc's plans and schedule to address the above items.

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

Enclosures
mfp:jlr

cc: Mr. Paul Brake, City Manager, City of Grand Blanc

525 West Allegan Street
Lansing, MI 48909
Phone: 517-290-8817
Fax: 517-241-3571

WSSN: 02740

Office of Drinking Water and Municipal Assistance

Lansing District Office

Water System Sanitary Survey

City of Grand Blanc Water System

December 2014

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Grand Blanc Water System — WSSN: 02740
County: Genesee — District: 11
Evaluator: Michael Prysby — Date: 12/18/2014

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source				x			
Construction & Maintenance				x			
Standby Power				x			
Isolation				x			
Source Water Protection				x			
Capacity				x			
Treatment				x			
Disinfection				x			
Fluoride		x					
Phosphate Addition		x					
Softening				x			
Iron/Manganese Removal				x			
Arsenic Removal				x			
Pretreatment		x					
Filtration (gravity or membranes)				x			
C*T		x					
Other		x					
Distribution System					x		
Interconnections w/ Other WS				x			
Hydrants & Valves	*Implement a valve turning program*				x		
Service Lines & Metering				x			
General Plan	*Update the GP by January 1, 2016*				x		
Cross Connections				x			
Construction & Maintenance				x			
Capacity				x			
Finished Water Storage					x		
Construction & Maintenance	*Re-coat the Saginaw Road tank in the next several yrs.*				x		
Controls				x			
Capacity				x			
Pumps (All Pumping Facilities)				x			
Construction & Maintenance				x			
Controls				x			
Capacity				x			
Monitoring & Reporting				x			
Bacteriological Monitoring				x			
Chemical Monitoring				x			
MOR or Annual Pumpage Report				x			
Consumer Confidence Report				x			
Analytical Capabilities				x			
System Management & Operations					x		
Owner Responsibility				x			
Capacity Development				x			
Reliability Study	*Update RS in 2016 or pursue waiver*				x		
Operations Oversight				x			
Permits				x			
Operator Compliance				x			
Operator Certification				x			
Technical Knowledge & Training				x			
Security				x			
Emergency Response Plan				x			
Site Security (Fences, Alarms...)				x			
Financial				x			
Rates				x			
Budget & Capital Imp. Plan				x			
Other		x					

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

WATER SYSTEM REVIEW

GENERAL

Basic Information

WSSN:	2740	Supply:	City of Grand Blanc	County:	Genesee
Date:	12/18/2014	Reviewed by:	MFP	District:	11

Primary Contact:	Matt Wurtz	Copy To:	Paul Brake
Title:	DPW dir.	Title:	City Manager
Telephone:	810-694-5420	Telephone	810-694-1118
Cell Phone:		Cell Phone:	
Pager:		Pager:	
Fax:		Fax:	
e-mail:	dpwdirector@cityofgrandblanc.com	e-mail:	
Address:	203 Grand Blanc Rd. PO Box 846 Grand Blanc, MI 48439	Address:	Same

Population:	8,400	Year:	2014	Basis:	MDEQ est.

Operator Certification

Distribution Classification: S-2

Operator in Charge:	Matt Wurtz	Cert.:	S1	OP No:
Other Operators:	Mike Blom		S1	
	Tim Kehn		S1	
	William Maxheimer		S2	
	David Dunn		none	
	Brian Kelly		S-2	
	Mike Richardson		none	

Treatment Capacity: 3.52 mgd

Treatment Classification: D-2

Operator in Charge:	Matt Wurtz	Cert.	D1	OP No:
Other Operators:	Mike Blom		D1	
	Tim Kehn		D1	
	William Maxheimer		D2	
	David Dunn		none	
	Brian Kelly		D-3	
	Mike Richardson		none	

Ownership: City

Annual Fee: Paid

Comments: The OIC accesses the MDEQ Operator Training Unit website to make sure that operators keep up to date with continuing education credits.

OURCE

Well Construction and Maintenance

/ell Number	4	5	7	8	2
Well Status	st. by	op.	op.	op.	st by
Treatment	Fe Rm/cl2	Fe Rm/RO	Fe Rm/RO	Fe Rm/RO	cl2
.O.E. ID #					
Treatment					
ear Installed	1964				
PS Coordinates	Lat.				
Long.					
routed?	yes	yes	yes	yes	yes
ock or Drift	rock	rock	rock	rock	rock
otal Depth	275'	323'	303'	340'	309'
asing Depth	153'	130'	156'	140'	
asing Diameter	12"	16"	16"	16"	10"
ump Setting			165'		50'
Static Water Level	25'	35'	26'	32'	
Pumping Water Level	92'	64'	98'	86'	106'
Pumping Water Level (100 day)					
/ell Log	yes	yes	yes	yes	
Pump Type	V turb	V turb	V turb	V turb	V turb
ermit Capacity (GPM)					
ermit TDH					
Current Capacity (GPM	432	1000	1000	800	420
Basis					
urrent TDH					
P	25	100	60	75	40
ast Pulled for Inspectio	1999	2005	2011	2007	1983
ast Efficiency Test	2008	2011	2011	2011	1983
ase/Surge/Lightening Protection					
/ell Seal	yes	yes	yes	yes	yes
asing 12" Above Grade	yes	yes	yes	yes	yes
ump to Waste Piping	yes	yes	yes	yes	yes
Screened or Capped?	no	capped	screened		no
/Vac Relief	yes	yes	yes	yes	yes
Screened?	no				no
asing Vent	yes	yes	yes	yes	yes
Screened?	yes	yes	yes	yes	yes
heck Valve (VT or Sub	yes	yes	yes	yes	yes
eter	yes	mag meter	mag meter	prop. Meter	yes
aw Tap	yes	yes	yes	yes	yes
emical Injection Tap	yes	na	na	na	yes
ant Tap	yes	na	na	na	no
emical Feed Outlet	yes	na	na	na	yes
ater	yes	yes	yes	yes	yes
ater Level Device	yes	yes	yes	yes	yes
essure gauge	yes	yes	yes	yes	yes
oor Drain	yes	yes	yes	yes	yes
ors open out	in	out	out	out	out
ase/Surge protection					
-O-A Switch	yes	yes	yes	yes	yes
n Timer					
ternating Relay					
perating Pressure					
essure Relief Valve					

SOURCE

Standby Power

WELL AUXILIARY POWER

Well Number	5 & 8	7		
Power type	Ele. Gen	Ele. Gen		
Power Rating (kWh or KVA)				
Fuel Type	Diesel	Diesel		
Capacity (gpm)	Full	Full		
Horse Power (HP)				
Starting Frequency	weekly	weekly		
Load Testing Frequency	weekly	weekly		

PORTABLE AUXILIARY POWER None

Isolation

Well Number	4	5	7	8
GPS Coord. Lat.				
Long.				
Approved Isolation Radius	100'	100'	100'	100'
Available Isolation Radius	300'	1000'	approx. 100'	1000'
Type of Isolation Control	mun own	mun own	mun own	mun own
GW flows from/direction				
Basis				
Important Potential Source				
Distance and Direction				
Important Major Source				
Distance and Direction				
Detects				
Sensitivity				
Susceptibility				

Comments:

Both WTP's have standby power sufficient to operate the wells and the treatment systems. Each WTP also obtains its primary source of electrical power from a different substation.

The city retains Peerless-Midwest to perform annual maintenance on each of the active production wells. Pumps and motors are not pulled during the annual maintenance; however, well efficiency tests are conducted. Pump & motors are pulled if the efficiency test indicates the need for more extensive maintenance. The stand-by wells continue to be pumped to waste on a monthly basis.

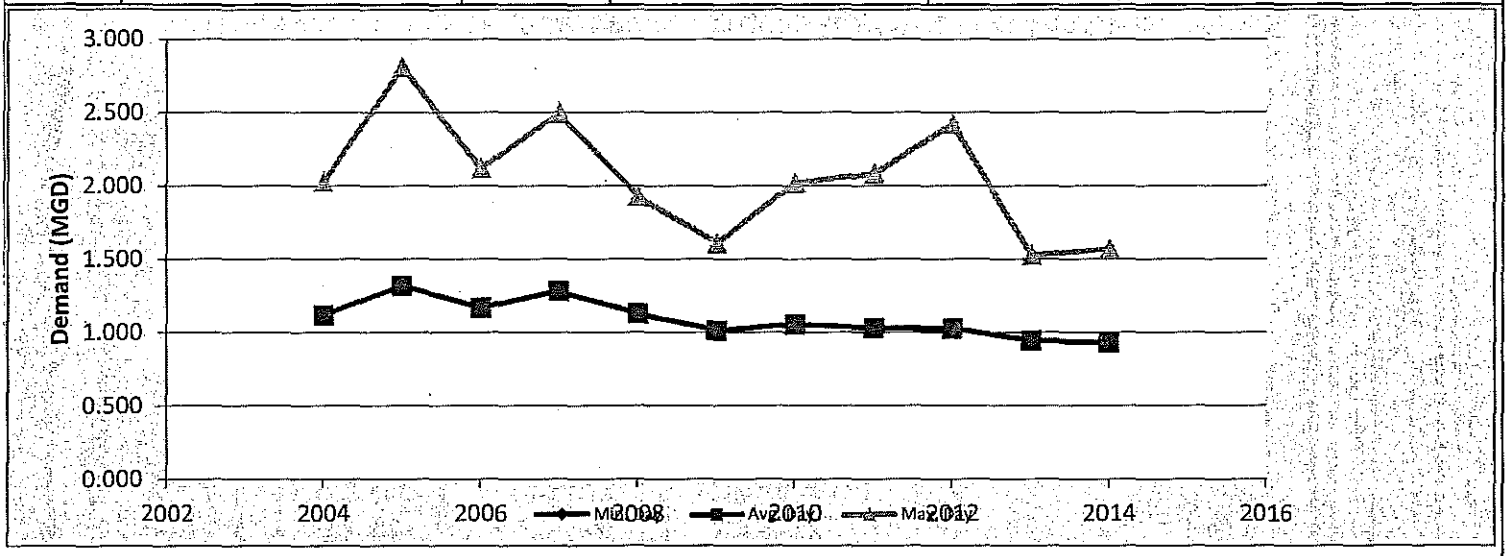
Grand Blanc has an approved wellhead protection program.

Pump motors will be replaced and equipped with VFD in Wells # 5, and 8. as part of the city's DWRF project. The project will also provide a VFD for the pump motor in Well #7 and overhaul of the existing pump & motor in Well #4. The work is expected to be completed in 2015.

SOURCE

Capacity

Year	Demand (MGD) Max. Day	Date	Avg. Day	Min. Day	Date	Max/Avg	Population History	G/C/D	% unacct.H_2O
2004	2.030		1.120			1.8125	8256	135.7	
2005	2.810		1.320			2.128788	8259	159.8	
2006	2.120		1.170			1.811966	8262	141.6	
2007	2.494		1.284			1.942368	8266	155.3	
2008	1.929		1.130			1.70708	8269	136.7	
2009	1.610		1.014			1.587771	8273	122.6	
2010	2.020		1.054			1.916509	8276	127.4	
2011	2.082		1.029			2.023324	8301	124.0	
2012	2.422		1.026			2.360624	8226	124.7	
2013	1.527		0.946			1.614165	8350	113.3	
2014	1.570		0.929			1.689989	8,375	110.9	



Five Year Max. Day	2.422		
Ten year Max. Day	2.810		
Five Year Avg. Day	1.000		
Max Day for capacity requirements:	2.810		
Peak Hour (Hydropneumatic)			
Max Day for capacity requirements:	see comment		
Baseline Capacity	3652	gpm	5.262 mgd
Total Well Capacity	3652	gpm	5.262 mgd
Firm Well Capacity	2652	gpm	3.821 mgd
Firm Well Capacity/Max. Day	136%		
Peak Hour/Firm Capacity		(Hydropneumatic w/o gravity storage)	
Total Aux. Power Well Capacity	2800	gpm	4.035 mgd
Aux. Power Well Capacity/Avg. Day	403%		

Comments:
Grand Blanc's average day demand has decreased slightly over the past ten years.

STORAGE

Construction, Controls & Maintenance

	Location: W of Saginaw	Location: E of Gas Light Ln	Location:
Volume	500000 gal	500000 gal	
Type			
O.F. Elevation			
Date Constructed	1966	1985	
Date Inspected	2013	2013	
Date Painted Inside	1990	2001	
Paint System			
NSF Std 61 Compliant (Y/N)	yes	yes	
Date Painted Outside	2006	1995	
Cathodic Protection	yes	yes	
Tank Isolation Valve	yes	yes	
Tank Drain (Hydrant)	yes	yes	
Altitude Valve			
Mud Valve	yes	yes	
High Alarm	yes	yes	
Low Alarm	yes	yes	
Type	scada	scada	
Total Head Range (Feet)			
Normal High Water Level			
Normal Low Water level			
Range of Operation			
Normal/Average Pressure			
Chart recorder	yes	yes	
Telemetering System	SCADA	SCADA	
Vents Screened	yes	yes	
Overflow Screened	yes	yes	
Access Hatches Locked	yes	yes	
Expansion Collar Lubricated			
Deflection Plate			
Overflow Splash Pad	yes	yes	
Site Fenced/Locked	yes	yes	

Capacity

Usable Storage	1,000,000	gal	1	mgal	
Total Usable Storage	1,000,000	gal	1.000	mgd	
Total Usable Storage/Max Day	40%				
Total Usable Storage/Avg. Day	100%				

Comments: Both tanks were inspected by Dixon in 2013. The Gas Light Ln tank's exterior is in poor condition and is scheduled to be repainted in 2015 as part of the city's DWRF project. The Saginaw Road tank's exterior and dry interior were in good condition. The wetted interior was in fair condition and re-coating is recommended within the next several years. Both tanks are controlled by the city's SCADA system.

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies? (Y/N) no
No. of Emergency Connections: 3 - with Grand Blanc Twp.

Location	Main Size	Est. Capacity	Metered?	Status (Regular/Emergency)	WSSN of Connection
Kings Pointe	8"		no	emergency	2745
Holly Rd	12"		no	emergency	2745
Saginaw Rd	12"		yes	emergency	2745

If emergency, are valves exercised annually? (Y/N) no
Flushed? (Y/N) no

Comments:

Grand Blanc city and Grand Blanc Township have a verbal agreement to utilize the emergency interconnections listed above; however there is no written agreement. The Saginaw Rd connection was used in 2010 to prevent a loss of pressure in a portion of Grand Blanc Twp's system during repair of a broken watermain.

The condition and proper maintenance of these interconnections remain a concern; however, it is our understanding that Grand Blanc Township is responsible for maintaining this infrastructure.

Distribution Piping

Identify distribution piping materials - estimate percentages:

Cast Iron	19 %
Ductile Iron	80 %
PVC	1 %
AC	%
HDPE	%
Galvanized	%
Concrete	%

Estimated percent of piping with coal tar lining 0 %

Identify distribution pipe sizes - estimate percentages:

2"	0	0%
4"	1450 LF	0.70%
6"	109,800 LF	49.70%
8"	65,000 LF	29.50%
10"	450 LF	0.20%
12"	43,700 LF	19.80%
16"	300 LF	0.10%

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? (Y/N) no

Are there areas where aesthetic water quality complaints are frequent? (Y/N) no

Do you receive complaints alleging illness due to the water? (Y/N) no

Are there areas where customers complain of low pressure? (Y/N) no

Are there areas where fire flows cannot be maintained? see comment

Comments: Additional improvement in fire protection was achieved in most areas due to water main replacements. The majority of the 4-inch watermains have been replaced with larger sized mains Any remaining 4-inch mains are less than 300 feet from larger sized mains.

The 2011 Reliability Study identified several commercial/residential areas within the city's distribution system having less than the 2500 gpm at 20 psi recommended fire flow.

Watermain replacement associated with the DWRF project will proceed in 2015 and includes looping several dead-end mains in residential areas.

Last ISO report date: 9/7/2005 Rating 3

DISTRIBUTION

Operational Concerns & Maintenance

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading, or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

Location:	Estimated Completion Date
Hattie (DWRF)	One block of 4-in main to be repl
West (DWRF)	One block of 4-in main to be repl
Terrace - Grant St	Replace 6-inch cast-iron

The existing mains in Hattie and West streets are to be replaced to improve flows for fire protection and eliminate dead ends.

The 2011 Reliability Study has identified the need to replace mains in several commercial areas, apartment complexes, and at the Grand Blanc Community schools in order to provide the desired level of fire protection. A list of recommended distribution system improvements is included in the study.

The city will need to update their water system General Plan by January 1, 2016 as part of the new requirements set forth in the Adm. Rules of the Michigan Safe Drinking Water Act. The updated plan will require inclusion of a water system capital improvements plan to meet the city's 5 and 20 year needs.

DISTRIBUTION

Hydrants

Number of Hydrants	419
Number Without Auxiliary Shut-Off Valves	0%
Number that are Self-Draining	60%
Number of Inoperable Hydrants	0

Frequency of Hydrant inspection: 1/yr

Inspection Staff: DPW

Comments:

Water mains are flushed once per year.

Are there areas where additional hydrants are needed? no

Hydrant location system: Gen plan Accurate? Yes

Are hydrants color coded for capacity? no

Has this information been provided to the fire department? yes

Frequency and seasons of hydrant flushing: 1/yr spring or fall

Purpose of flushing: hydrant maintenance and main flushing

Is the public notified prior to flushing? yes

Does flushing follow a specific format? yes

Is the volume of water used during flushing estimated? yes

Is a record maintained of hydrant activities? yes

Comments:

The DPW maintains a binder with records and locations for hydrants and valves. Hydrant information is also stored in the city's GIS system.

DISTRIBUTION

Valves

Number of Valves 516

Number of inoperable valves 0

Are there areas where additional valves are needed? yes

If yes, list locations:
Additional valves are needed in the older residential areas.

Valve location system valve log Accurate? yes

Valve Turning Frequencies Some valves turned during flushing

Primary:

Others:

Records Maintained? yes

Comments:

The DPW maintains good valve records consisting of a binder showing valve locations. Valve information is also entered into the city's GIS system. An active valve turning program is not in place; however some valves are operated during hydrant flushing.

DISTRIBUTION

Customer Service Information

Number of service connections	2650
Number of metered service connections	100%

Identify service line materials and estimate percentages:

Copper	100%
PVC/PE/PB	0%
Galvanized	0%
Lead	0

Ownership of Service	(CWS/Customer)
From Corp Stop to Curb Stop	city
From Curb Stop to Property Line	customer
From Property Line to Meter	customer
Meter	city

In addition to the service connections listed above, there are approximately 500 connections for irrigation.

Customer Meters

Types of meters Used	Inventus, & Sensus
Number of Meters with Touch Pads or Other Remote Reading Devices	95%
Size of Meters	
Residential	3/4" - 1"
Industrial/Commercial	1-8"
Meter Testing/Maintenance Program	1.5" and larger tested every 3 yrs
Average Age of Meter is System	not determined
Residential/Commercial/Industrial	
Criteria for Changeout	accuracy
Number or Percent Changeout per Year	5%
Master Meter Locations	none
Calibration of Master Meters	na

Meter Reading Staff/Contract: DPW

Percent By Usage		
% Residential	75%	
% Commercial	15%	
% Industrial	10%	
% Other		
% Large Users - List		General motors
		Grand Blanc Schools
		River Bend Nursing Home
		Pro Clean Dry Cleaner
		Perry Place Apts
		Sunset Apts
		Country House Apts

Comments: Meter testing is performed on larger customer meters. Residential meters are tested if a customer challenges a high read. Also, any older meters (non-touch-pad) are replaced when found.

The city is upgrading their meter system to a fixed-base meter read system as part of the DWRF project. The system will consist of a 2-way radio read system allowing all meters to be read from a single location and hourly usage to be monitored. The upgrade will call for any remaining Rockwell meters (approx. 250) to be replaced since these meters are not compatible with the radio read system.

DISTRIBUTION

System Growth

Year	No. of Residential Meters Installed	No. of Comm./Industrial Meters Installed	No. of Construction Permits Issued	Permitted Amount of WM Feet
2001			2	1910
2002			1 sub phase	900
2003			RO treatment	
2004			1	884
2005			2 subs, 1 phase	4500
2006			0	0
2007	0		1	775 - wm repl
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	5	0	1 - DWRF	1542 WM repl

Water Rates

What is your current rate schedule?	$2.50 per 100 cf
Are current rates adequate to support O&M and CIPS?	yes
When was last time rates were adjusted?	Su. 2010
Has a water rate study been performed? When?	2003
Is there a meter charge or ready to serve charge?	$11.00/2-mo for ready to serve
Is a copy of the water rate schedule and ordinance available?	yes - on line

Comments: 5 new residential customers were added in 2014 and approximately 35 new starts are projected for 2015. Water rates were increased in 2010 and the increase was based on the 2003 rate study. $1500 tap-in fee/ unit for the first 2 units and $800/unit for each unit thereafter.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	Maintains supply ranging from 4" - 12"
Repair Clamps (2 or more for each size)	50 of assorted sizes
Tees, Crosses & Elbows	many
Hydrants	6 new, 14 old for parts
Valves	many
Services (Corp & Curb Stops, Clamps and Lines)	many
Other	

Safety Issues

Confined Space Entry Program in Place % Followed (Y/N)	yes
Trench Safety Program in Place & Followed (Y/N)	yes

Comments:
The city is essentially built out with the exception of a scattering of vacant lots allowing for some limited expansion of residential customer base.

PROGRAM COMPLIANCE

Cross Connection Programs

Ordinance No: 78 Date: 5/29/1973

Approved Program (Y/N)? yes Date:

Staff Assigned to Program, (No., Dept and/or who) DPW

Is Annual Cross Connection report required (Y/N)? yes

Was previous year's annual report received (Y/N)? yes Date Received: 3/20/2014

Was previous year's annual report acceptable (Y/N)? yes

Inspection Status: Active, high hazard accounts inspected 1/yr, low hazard accounts inspected 1/2yrs

Device Testing Frequency see comments

Recordkeeping: A list of the cross connection accounts is available

Private Well Isolation/Abandonment Procedure:

Comments: The DPW maintains a prioritized list of accounts where cross connection inspections are completed each year. Service line protection has been provided at the GM facility. The RPZ is located in an above ground building. GM continues to conduct device testing on all internal devices and provides the city with copies of the test reports.

Given the use of venturi type device soap dispensers on all janitorial sinks at the local schools, the city now requires full (service line) protection .

Annual Pumpage Reports

Is Annual Pumpage Report required (Y/N)? No

Was previous year's annual report received (Y/N)? No Date Received:

Monthly Operator Reports

Are Monthly Operation Reports required (Y/N)? yes

Were all previous year's reports received (Y/N)? yes Timely? yes

Are previous year's reports acceptable (Y/N)? yes

Consumer Confidence Reports

Is the annual CCR requires? (Y/N) yes

Was the previous year's report received? (Y/N) yes Timely?

Was the previous year's acceptable? (Y/N) yes

Was the previous year's certification form received? (Y/N) yes Timely?

PROGRAM COMPLIANCE

Emergency Response Plan (ERP)

Date of Most Recent Plan: January 2013 Acceptable? Yes

Filed where? MDEQ, DPW

The 2013 site visit confirmed that the city prepared an acceptable ERP.

General Plan (GP)

Date of Most Recent Plan: 2014 Acceptable? Yes

Filed Where? MDEQ, DPW

The city's water system GP is kept updated; however, the plan will need to be updated by January 1, 2016 to show pressure contours during peak demand and list capital improvements for the 5-yr and 20-yr planning periods.

Reliability Study (RS)

Date of Most Recent Study: 2011 Acceptable? Yes

The 2011 water system RS is due to be updated in 2016. Revision of the RS may be waived if no significant water system changes are documented.

Permits

Applies for and obtains permits prior to construction (Y/N):	
Reviews plans from engineers and/or developers prior to submittal to DEQ (Y/N):	
Standard specifications on file at CWS (Y/N):	
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):	
Follows master plan for any construction (Y/N):	
Actually follows plans as permitted (Y/N):	
Develops as-built plans (Y/N):	
Updates general plans (Y/N):	

Date of Last Master Plan: _____

Capacity Development

	Submitted	Acceptable
Technical Capacity		
Site and/or general plan		
System reliability addressed-dual feeds, standby power, storage		
Purchase agreement		
Financial Capacity		
Acknowledgement of annual fee		
Annual budget plan for next 5 years		
Sources of revenues (rates, fees, etc.)		
Planned expenses (O&M, administrative, engineering, accounting debt service)		
Capital improvements costs/account & plans		
Capital replacement account and plans		
Documentation of acceptance repayment plans from lending and bond authorities		
Managerial Capacity		
Chain of command and clear lines of responsibility		
Sample site plans		
Acknowledgement of monitoring costs		
Cross connection control program		
Standard Specifications		
Plans/Methods for providing legal doctrine (ordinances, policies, plans)		
Customer complaint handling format		
Operator training program		

MONITORING

Bacteriological

Date of Approved Site Sampling Plan :	31-Jan-13
Are samples still being collected in accordance with the plan? (Y/N)	yes
Number of samples required each month:	9
Basis for Setting Number of Monthly Samples:	pop
Certified Lab Used:	MDEQ
MCL, Monitoring or Reporting Violation(s)? (Y/N)	no
Number & Type of Violations in past 12 months	
Public Notice Issued according to regulations? (Y/N)	na

The 2013 sampling site plan is acceptable. Our contacts; however, need to be updated to reflect our current phone numbers.

Chemical

Date of Monitoring Schedule:	2/14/2014	
Are samples still being collected in accordance with the schedule? (Y/N)	yes	
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)		
If nitrate detect, what is concentration?	ND	Sample Site
If nitrite detect, what is concentration?	ND	Sample Site
Detects for metals > 50% of MCL? (Y/N)	Yes	
Metals (list)	Arsenic at Well #4 (5 - 8 ppb)	
Detects for VOCs (Y/N)	no	
Detects for SOCs (Y/N)	no	
Date of Approved Disinfection Byproduct Monitoring Plan :	Dec-13	
DBP Sampling Done? (Y/N/Waived)	yes	
If yes, done to site sampling plan? (Y/N)	yes	

Lead and Copper Monitoring

No. of Samples Required:	20	
Semi Annual/Annual/Triennial	triennial	
Exceedance of lead or copper action level (Y/N)	no	
If yes, was public education issued (Y/N)		Date Issued:
Next Monitoring Period:	6/1/2016 9/30/2016	
Corrosion Control Program, if applicable		
Lead service line replacement status, if applicable		

Radiological Monitoring

Date of Monitoring Schedule	2014		
Are samples still being collected in accordance with the schedule? (Y/N)	yes	Date Collected	
Alpha, beta, radium, uranium		Date Collected	7/14/2011
Radon		Date Collected	
Tritium		Date Collected	
Detects for Rads > 50% of MCL? (Y/N)			

If yes, list

WTP 5&8 - Gross Alpha 3.22 piC/L
Ra - 226: 1.05 piC/L
Ra - 228: 2.33 piC/L

Well #7 - 5/22/2001 Gross Alpha: <3 piC/L
Ra - 226: 0.5 piC/L
Ra - 228: <0.8 piC/L

Iron Removal Plant

Plant Address: Three iron removal treatment facilities located at:

IR Plant (Well 4)
12412 Via Catherina

RO/IR Plant (Wells 5 & 8)
1301 Bush Creek Dr

RO/IR Plant (Well 7)
231 Jewett Trail

Construction Features and Dates:

IR facilities at Well 4 and 7 were constructed in 1992. IR facility at wells 5 & 8 was constructed early in 1993. RO membrane softening was added in 2004 (IR 7 and 5&8). Raw water iron ranges between 0.3 and 0.6 mg/l with the treated iron concentration ranging between 0.00 and 0.05 ppm which meets the city's treatment objectives.

IR plants #5 & #8 and #7 are referred to as WTP 5&8 and WTP 7

The IR facility at well 4 does not have RO softening and the facility is now used for emergency stand by.

Plant Design Capacity:

Plant capacity is based on a filtration rate of 3 gpm/sqft

Plant Rated Capacity:

IR plant well 4:	432 gpm/0.622 MGD
WTP 7:	1000 gpm/1.44 MGD
WTP 5&8:	1800 gpm/2.6 MGD

Total Treated Water Storage:

At plant site, WTP (5&8):	30000 gal
At plant site, WTP (7):	20000 gal
Distribution:	1000000 gal
Total:	1050000 gal
% max day:	37

Iron Removal Plant Facilities:

Raw water metering:

Water flow is metered at each wellhouse and at each plant tap or point of entry into the system.

Meter type: Rockwell International propeller meters are provided at each wellhouse. A new mag-meter has been ordered for Well #7 and will be installed early in 2012.

Pumps and Pump Locations

Well Sources:

Well	HP	Type
4	25	V. Turb
7	100	V. Turb
5	100	V. Turb
8	100	V. Turb

Firm Capacity: 3.82 MGD

High Service:

IR Plant 4	WTP 7	WTP 5&8
One centrifugal pump rated at 432 gpm.	Two centrifugal pumps rated at 1000 gpm.	Two centrifugal pumps rated at1800 gpm.

Firm Capacity: 4.03 MGD
Based on 1 pump out of service at WTP 7 and WTP 5&8.

Backwash: Water from the in service filters is used for backwash.

Conditions of Pumps: The treatment facility pumps are in good working condition. The chlorine feed points are located prior to the WTP clearwell thus, the chorine is adequately mixed prior to reaching the pumps. Each of the pumps (except IR Plant 4) are VFD controlled.

Source of Backwash: Water from the in-service filters.

Disposal of Backwash Water: sanitary sewer
Sludge: NA

High Service Metering: New Sensus propeller meter at well 4
Rosemount mag meters at WTPs 5&8 and 7

Location of Switch Gear: Wellhouse
Susceptibility to flooding: Minimal

IR Plant #4 is backwashed 1/wk mainly to expand the filter media to keep it functional in the event that the facility needs to be used. The facility is also operated once a month for approximately a half hour.

Pretreatment Facilities

	IR Plant 4	WTP Plant 7	WTP Plant 5&8
Type	draft aeration, detention	draft aeration, detention	Same as 7
Number of Units:	1 - 65 inch dia aerator	1 - 99-inch dia aerator	1 - 120 inch dia aerator
Rated Capacity (gpm):	432	1000	1800
Detention Time (min):	20	20	20
Tank Size (gal):	8640	19440	35000
Inlet Design:	Float operated butterfly valve type lever control		
Outlet Design:	Monoflange rubber seated butterfly valve.		
Overflow:	4"	Overflows to the backwash sump	
Drains:	4"	Drains to backwash sump	
Condition	The 2014 inspection confirms that the treatment plants are well maintained and appear to be in good condition.		

Filtration

	Plant 4	WTP 7	WTP 5&8
Number of Filters:	4 cells	4 cells	4 cells
Area of Filters (sq. ft):	144	324	576
Design Filtration Rate (MGD)	0.622	1.44	2.59
	3 gpm/sq ft	3.08 gpm/sq ft	3.12 gpm/sq ft
Filter Media:	Same as Plant 5&8	Same as Plant 5&8	24" anthracite over supp. Bed -3" sand 3/4-1/2" -2" sand 1/2-1/4" -2" sand 1/4-1/8" -2" sand 1/8-#16 UN Coeff: 1.7 Eff. Size: 0.6-0.8 mm

Date Last Rebuilt or Checked:

As part of DWRF Project No. 7387-01 (Permit issued June 6, 2014), complete replacement of the filter media will proceed in 2015. The project also includes application of a 3-coat epoxy system to the wetted interior of the iron filter tank and modifications to system controls. The media will be re-bedded in the same manner as the original construction.

Underdrain Type: Ceramic filter laterals

Backwash Requirements:

Values are listed for IR plant 4, WTP 7 and 5&8 respectively
-air problems - none
-backwash rate - at 432, 972, 1800 gpm (12 gpm/sq ft)
-normal length of wash - 35 min 15000, 34000, 75000 gal per wash
-disposal of backwash water - sanitary survey
-criteria used for backwash - filter loss of head indicator (1/week minimum)

Rate of Flow Devices:

Calibrated V-notch weir (backwash)
Mk 515 Rotor-paddle wheel flow sensor (filtered water)

Length of Filter Runs: One week

Filter to waste: Sanitary sewer

Associated Problems/Causes:

Mudballs - None
Air Binding - None
Cementing - None
Gravel Mounding - None
Media Loss - None since repairs to WTP 7
Cracking - None
Media Attrition - None
Bacteria growth - None
Uniform backwash - None
Media Growth - None
General Problems - None have been noted, WTP operators inspect the media on a yearly basis.

Plant Piping and Miscellaneous

Pipe Diameter, Identification, etc.

Low Service Discharge	Green
Filtered Water	Blue
High Service Discharge	Dk. Blue
Backwash	Lt. Green
RO Permeate	Md. Blue
RO Concentrate	Lt Brown
Waste	Brown
CIP	Orange

Plant Controls:

A SCADA system is in place with control equipment installed at both tanks, all 5 well locations and the iron removal facilities. In addition, a distribution system location for pressure recording and a location within the sanitary sewer for backwash measurements is provided. This information is relayed back to the main control panel at the DPW office.

Metering:	Flow rate and totalizer are monitored and controlled at the DPW building.
Chem Feed:	Controlled from the DPW
Filters:	Status of operation are monitored and controlled from the DPW.
High service pumps:	Controlled from the DPW.

Alarms:

Cl Leak	Audible at 1 ppm
Low Service Well	Pump and Power Failure
Elevated Tank Low Level	yes
Elevated Tank High Level	yes
Elevated Tank Loss of Signal	Power fail alarm.
Security	Entry alarms are provided at each treatment facility & at each elevated tank. All sites are also fenced and all entrance gates are locked.

Flexibility in Operation:

	Unit Bypass	Plant Bypass
Pretreatment	no	yes
Filters	no	yes

Piping Structural Integrity:	Good Cond
Roof Drains:	Roof gutters with downspouts
Interruptions in Operation:	None

Provision to by-pass the RO treatment at IR Plant #7 is not provided since the RO facility plays a role in achieving compliance with the arsenic MCL.

Low Pressure Reverse Osmosis (WTP - #5&8)

Type of Units: Osmonics Model: RO Muni - 300
Date Installed: Jun-04

No. of CMF Skids/Arrays: 3 No. of Modules/CMF Unit: 12 modules - 6 elements per module
Extra Modules Onhand (Y/N): No
No. of Extra Modules: None

Method of Providing PLC Redundancy: Each unit has back-up PLC.

Maximum Approved Transmembrane Pressure: _____ PSI
Maximum Operating Transmembrane Pressure: _____ PSI

Maximum Approved Filtration Flux Rate (w/units): _____ gpm/m^2 _____ $gals/ft^2/day$
Maximum Operating Filtration Flux Rate (w/units): _____ gpm/m^2 16-18 $gals/ft^2/day$

Membrane Influent Capacity: 360 GPM per skid
Membrane Permeate: 290 GPM per skid
Membrane Concentrate: 70 GPM per skid

Cartridge Filter Feed Pumps:

3 - 10 HP Low Pressure Horizontal Split Case pumps rated at 353 GPM @ 63 Ft TDH

Membrane Feed Pumps: Number: 3 Type: HC
Capacity: 353 gpm TDH: 347ft
Capacity: Total: 1059 gpm Firm: 720 gpm
Treatment Rate/Module: 360 gpm

Blend Pumps:

2 vertical split case pumps each rated between 250 and 650 GPM @ 3.5 to 14.0 Ft TDH. The blend pumps are controlled by the WTP PLC and are operated by a variable frequency drive control unit.

No. of Prefiltration Strainers 9 (three in series per skid)
Type of Strainers: Cartridge Filters Self/Manual Cleaning: Disposable
Size of Units: 40 X 6 - inch Mesh Size: 1 Micron
Cross Connection Protection of Auto Cleaning Systems (Y/N): Yes

Each cartridge filter contains 7 internal filters. The cartridge filters are replaced every two months or if stain begins to bleed through. These filters are located ahead of the RO system and they protect the RO membranes.

Membrane Comments:

Each of the three membrane skids contains 12 modules. Treatment in each skid is provided in three stages. Stage 1 passes water through the first six modules, Stage 2 treatment passes concentrate from Stage 1 through the next 4 modules. Stage 3 treatment treats the concentrate from Stage 2 through the last 2 modules. The overall recovery rate was reduced from 87% to 81% in order to reduce the rate of scaling on the third stage membranes. 360 GPM of influent results in approximately 290 gpm of permeate from each membrane skid.
The treatment plant normally operates with 2 skids on-line.

Laboratory/Analytical Equipment

Chlorine, Iron: Hach DR 2400
Arsenic: Hach. Cat 280000
Hardness, Chloride: Hach 16900 Digital Titrator

Air Compressors: Number: 2 doubles HP: 5
SCFM: 23 PSI: 120

2 dual air compressors are provided to operate the pneumatic controlled valves.

Clean in Place (CIP) System

Chemical(s) Used: CIP soln - Avista RoClean L403 and L211 (low pH and high pH)
Recirculating Pump(s): No.: 1 TDH: 64 feet Goulds Pump
GPM: 225 HP: 15
Volume of Solution Tank: 7 ft dia. X 7 ft 1000 gallons

Cross Connection Protection Between Arrays/Units for CIP Piping (Y/N): Yes
Hours of Operation Between Chemical Cleanings: Based on differential pressure
Full Restoration of TMP? (Y/N): Yes If No, Describe: Stage 3 modules were replaced and function as designed.

The CIP system uses RoClean liquid cleaner supplied by Avista. The L403 is a low pH cleaner and the L211 is a high pH cleaner, both NSF Std 60 approved. The CIP piping system has been modified by WTP staff to allow sequential cleaning of each stage; thus' preventing additional fouling of the third stage membranes. Sequential cleaning is accomplished by installing temporary piping from the CIP tank to each individual stage of membranes. Valving changes were also made to isolate each stage for separate cleaning. The piping and valving alterations and the modified method of cleaning has performed well and the improvements have eliminated additional fouling of the third stage membrane that was recently replaced. WTP staff also heat the CIP solution to approximately 115 deg F which has demonstrated more effective cleaning of the RO membranes. The frequency of CIP is approximately once every 7 months.

Prior to discharge of the spent CIP, ferric chloride is added to coagulate the concentrated iron and arsenic. The flocc is passed through seven 0.1 micron filters with a 1.5 HP dewatering pump. The filters are a post filter housing Model HX0740 - 3.0V-316-A Caustic soda is also added to the spent CIP solution for pH adjustment in order to meet Genesee County's discharge requirements.

Operation:
Hours Per Day Operator Attendance: 5 days per week (4 - 8 hours/day)
Sat & Sun - 2.5hrs/day

Low Pressure Reverse Osmosis (WTP - #7)

ype of Units: Osmonics Model: RO Muni - 300

ate Installed: Jun-04

o. of CMF Skids/Arrays: 2 No. of Modules/CMF Unit: 12 modules - 6 elements per module
Extra Modules Onhand (Y/N): No
No. of Extra Modules: None

ethod of Providing PLC Redundancy: Each unit has back-up PLC.

aximum Approved Transmembrane Pressure: _____ PSI
aximum Operating Transmembrane Pressure: _____ PSI

aximum Approved Filtration Flux Rate (w/units): _____ gpm/m^2 _____ $gals/ft^2/day$
aximum Operating Filtration Flux Rate (w/units): _____ gpm/m^2 16-18 $gals/ft^2/day$

embrane Influent Capacity: 360 GPM per skid
embrane Permeate: 290 GPM per skid
embrane Concentrate: 70 GPM per skid

artridge Filter Feed Pumps:

Horizontal Split Case pumps rated at 360 GPM @ 68 Ft TDH

lembrane Feed Pumps:

Number: 2 Type: HC
Capacity: 353 gpm TDH: 347ft
apacity: Total: 720 gpm Firm: 360 gpm
Treatment Rate/Module: 360 gpm

lend Pumps:

vertical split case pumps each rated between 250 and 650 GPM @ 3.5 to 14.0 Ft TDH.
nese pumps are currently operating at approx. 200 gpm due to lower recovery rate.

o. of Prefiltration Strainers 6 (three in series per skid)

Type of Strainers: Cartridge Filters Self/Manual Cleaning: Disposable
Size of Units: 40 X 6 - inch Mesh Size: 1 Micron
Cross Connection Protection of Auto Cleaning Systems (Y/N): Yes

ach cartridge filter contains 7 internal filters. The cartridge filters are replaced every two months or if stain egins to bleed through. These filters are located ahead of the RO system and they protect the RO membranes.

embrane Comments:

ach of the two membrane skids contains 12 membrane modules. Treatment in each skid is set-up in a 6:4:2 configuration milar to WTP #5 & #8 and the recovery rate was reduced to 81%.

aboratory/Analytical Equipment

hlorine, Iron: Hach DR 2400
rsenic: Hach. Cat 280000
ardness, Chloride: Hach 16900 Digital Titrator

ir Compressors: Number: 2 doubles HP: 5
SCFM: 23 PSI: 120

dual air compressors are provided to operate the pneumatic controlled valves.

lean in Place (CIP) System

Chemical(s) Used: CIP soln - Avista RoClean L403 and L211 (low pH and high pH)
Recirculating Pump(s): No.: 1 TDH: 64 feet Goulds Pump
GPM: 225 HP: 15
Volume of Solution Tank: 7 ft dia. X 7 ft 1000 gallons

Cross Connection Protection Between Arrays/Units for CIP Piping (Y/N): Yes
Hours of Operation Between Chemical Cleanings: Based on differential pressure
Full Restoration of TMP? (Y/N): Yes If No, Describe:

ne CIP system uses RoClean liquid cleaner supplied by Avista. The L403 is a low pH cleaner and the L211 is a high pH uid cleaner, both NSF Std 60 approved. The piping and valving modifications were completed at WTP #7 in the same anner that they completed at WTP #5 & #8. Operators also heat the CIP solution for more effective membrane cleaning. CIP operation is performed approximately one every 10 to 12 months.

ior to discharge of the spent CIP, ferric chloride is added to coagulate the concentrated iron and arsenic. The flocc is assed through seven 0.1 micron filters with a 1.5 HP dewatering pump. The filters are a post filter housing odel HX0740 - 3.0V-316-A. Caustic is added to the spent CIP solution for neutralization prior to discharge to the sanitary ewer.

peration:
Hours Per Day Operator Attendance: 5 days per week (4 - 8 hours/day)
Sat & Sun - 2.5hrs/day

Disinfection

Point of Treatment	Both WTPs	Injection Point:	Blend point & applied	
SDWIS Facility ID (Site Code)				
Year Initiated	1992	Purpose:	Disinfection, oxidation	
Product	Gas chlorination	Manufacturer:	Alexander Chem.	
Chemical Strength	100.00%	Dilution:	none	
ANSI/NSF Standard 60 Approval? (Y/N)	yes	NSF max dose:		mg/L
Normal Feed Rate/Dosage	Plant 5 & 8 - 0.59 mg/l		Plant #7 - 0.51 mg/l	
Avg Plant Tap Residual (mg/L)	total: Plant 5 & 8 - 0.49 mg/l		total Plant #7 - 0.53 mg/l	
Avg Distribution Residual (mg/L)	free 0.5		total 0.51	
Frequency of Residual testing	Plant Tap: daily	Distribution:	daily	
Analytical Method Used	Hach DR 2400	Instrument:		
Any Overfeed Instances? (Y/N)	no	Date(s):		
Any Low Feed Instances? (Y/N)	no	Date(s):		
Feeder Type:	Wallace-Tiermain chlor	Model:	V-100	
Number of feeders:	2			
Feeder Capacity	lbs/day: 0-20 lbs/day	gpd min:		
CL2 Gas storage	150 Lb cylinders	Volume:		
Weight/Level Reading Method	WT Series 50-350 dig scale			

SAFETY

Separate Room	yes	Cylinder Repair Kit	yes
Exhaust fan	yes	Extra Chlorinator or repair kit	NA
Fresh Air Vent	yes	Ammonia Bottle	yes
Door Opens Out With Panic Bar	yes	Self Contained Air Packs	30 min supply
More than 1500 # Cl_2 onsite	NA	Training Programs	
Electrical Protected from Gas?	NA	Shower/Eye Wash	no

Comments:
The chlorine room at each plant is located in a separate room at both plants with exterior access. Each room is equipped with leak detection, chlorine alarm, exhaust fan, and panic hardware.

Anti Scalent

Point of Treatment (Wellhouse Name)	WTP	Injection Point:	Prior to membrane skids	
SDWIS Facility ID (Site Code)				
Year Initiated	2004	Purpose:	Prevent membrane fouling	
Product	Avista Vitech 3000	Manufacturer:	Avista	
Chemical Strength		Dilution:		
ANSI/NSF Standard 60 Approval?	yes	NSF max dose:		mg/L
Normal Feed Rate	Plant #5 & 8 - 2.5	mg/L	Plant #7 - 2.58 mg/l	
DEQ Permitted Feed Rate or Dosage		mg/L		
Avg Plant Tap TDS	Plant #5 & 8 - 360	mg/l	Plant #7 - 261 mg/l	
Residual Testing Technique	Milton Tech Pro II - TDS & conductivity meter			
Frequency of Residual testing	Plant Tap: daily	Distribution:		
Any Overfeed Instances? (Y/N)	no	Date(s):		
Any Low Feed Instances? (Y/N)	no	Date(s):		
Pump Type:	Pos. displ. Metering	Model:	Premia 75	
Pump Capacity	gpd max: 4.0 gph	gpd min:		
	psi: 250			
Chemical Storage Tank Type	see comment	Volume:		
Weight/Level Reading Method	digital scale Mod. XT10PS-MA			

Comments:
Three metering pumps and one spare are provided at Plant #5 & 8. Two metering pumps and a spare are provided at Pant #7. Chemical storage consists of 3 -45 gallon day tanks at Plant #5 & 8 and 2- 45 gallon day tanks at Plant #7.

Caustic Soda

Point of Treatment	Both WTPs	Injection Point:	Finished water
SDWIS Facility ID (Site Code)			
Year Initiated	2004	Purpose:	pH adjustment
Product	25% sodium hydroxide	Manufacturer:	Alexander Chem.
Chemical Strength	25.00%	Dilution:	none
ANSI/NSF Standard 60 Approval? (Y/N)	yes	NSF max dose:	mg/L
Normal Feed Rate/Dosage	Plant #5 & 8 - 12.75 mg/L		Plant #7 - 16.1 mg/l
Avg Plant Tap pH (mg/L)	Plant #5 & 8 - 7.9		Plant #7 - 8.0
Frequency of Residual testing	Plant Tap: daily	Distribution:	
Analytical Method Used	pH probe	Instrument:	
Any Overfeed Instances? (Y/N)	no	Date(s):	
Any Low Feed Instances? (Y/N)	no	Date(s):	
Pump Type:	Pos. displ metering	Model:	Premia 75
Number of Pumps:			
Pump Capacity	gpd max: see comments	gpd min:	
	psi 50 psi		
Chemical storage tank type	6000 gal bulk storage	Volume:	6000 gallon
Weight/Level Reading Method	Top mounted range transducer		

Comments:
Four positive displacement pumps (includes two spare pumps) are provided at each treatment plant and the capacities are as follows:
Plant #5 &8: 10 gph @ 50psi
Plant #7: 5.5 gph @ 50psi

The amount of sodium hydroxide used is set to attain a finished water pH of 8.0. The volume drawdown in the storage tank is determined by a Miltronics Mini Ranger Plus transducer mounted on top of the tank. The bulk storage tank also has a remote digital reader. A calibration chamber is provided for feed determination.

One 6000 gallon bulk storage tank along with a 250 gallon day tank (200 gallon day tank at Plant #7) are provided. Product is fed by gravity to the day tank when the bulk tank is more than half full, otherwise, a transfer pump is used. Adequate containment is provided and the bulk storage tank is re-filled approximately three times a year.

2740

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

December 21, 2011

Mr. Matt Wurtz, DPW Director
City of Grand Blanc
203 Grand Blanc Road
P.O. Box 846
Grand Blanc, Michigan 48439

WSSN: 2740

Dear Mr. Wurtz:

SUBJECT: City of Grand Blanc; 2011 Water System Review (WSR)

This letter confirms my visit on December 7, 2011. The purpose of the visit was to update the Grand Blanc 2008 WSR. The 2011 WSR also includes an updated Sanitary Survey of the water treatment plants (WTPs) at Well #7 and Wells #5 & #8. A copy of 2011 WSR and Sanitary Survey are enclosed with this letter.

The findings of Grand Blanc's updated WSR reveal that the city's water system remains in "satisfactory" condition. The evaluation did not reveal any critical water system deficiencies. Specific water related items that were discussed during the review are summarized in more detail below.

1. Grand Blanc has not proceeded with maintenance (external repainting) of the 0.5 million gallon elevated tank located at Gas Light Lane. The 2005 tank inspection revealed the need to repaint the tank's exterior and to complete other minor repairs. Our recent inspection also confirms that the exterior paint system is in poor condition and is in need of repainting. Finally, the tank was lasted painted in 1995.

   The city needs to proceed with the recommended work from a preventative maintenance standpoint. The elevated water storage tank represents a significant water system investment that needs to be protected. Maintaining and/or re-applying an external epoxy coating system helps to protect the tank's structural integrity and maximizes the useful service life of the tank. This work needs to proceed as soon as possible in to prevent any further deterioration of the existing paint system and the tank's exterior structure

   Finally, the Gas Light Lane tank is due for an internal inspection. We recommend that the tank be inspected prior to repainting the exterior in the event that additional preventative maintenance is needed. The city needs to follow through on repainting the tank's exterior and completing any other tank maintenance recommendations in a timely manner in order for it to remain in good structural condition.

2. The city has completed a water system reliability study and, based upon our review, the study meets our requirements and is acceptable. The study identifies various water distribution system improvements that are needed in order to achieve the desired level of fire protection in certain areas of the city including; the Grand Blanc Community schools, several commercial districts, and several large apartment complexes. We encourage the city to establish a water system capital improvements program aimed at replacing

remaining undersized mains in order to achieve the desired level of fire protection in these areas.

3. It is our understanding that the city is considering an upgrade of their existing touch-pad metering system to a fixed-base radio read system. The fixed-base system would allow customer meters to be read from a single location. The system also has the capability to monitor short-term usage for any given customer and can detect excessive water usage or unnoticed leaks before they may pose a problem. The radio read system would also reduce staff time needed to read individual meters. We encourage the city to pursue upgrading their metering system to a radio read system.

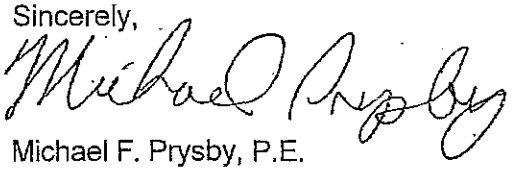
4. The city's most recent water system contingency plan needs to be replaced with an Emergency Response Plan (ERP). A recent revision to the Administrative Rules of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, now requires an ERP in place of the contingency plan. The ERP provides an outline to follow in the event of a water related emergency (loss of pressure, contamination, etc.). The ERP is similar to a water system contingency plan; however, the ERP calls for discussion of various types of water utility operational plans that may be utilized during a water related emergency. An ERP template was provided to you and can be used for preparing Grand Blanc's ERP. We will review the completed ERP during our next routine surveillance visit.

5. Grand Blanc's most recent bacteriological sampling site plan needs to be updated to reflect the change in the repeat sampling protocol due to the new Groundwater Rule. The plan also needs to be updated to reflect any changes in staffing in the public works department. An updated sampling site plan template was provided to you and this template can be used in preparing an updated plan. Please provide us with a copy of the updated sampling site plan after it has been updated.

Finally, Grand Blanc Township has raised the issue of maintenance concerns and possible elimination of the three emergency interconnections between the city and township's water systems. This issue will be discussed in a separate letter.

We appreciate the time taken to meet and discuss the above issues. Should you require any further information, please contact me at the telephone number below; via e-mail at prysbym@michigan.gov; or Department of Environmental Quality, P.O. Box 30242, Lansing, Michigan 48909.

Sincerely,



Michael F. Prysby, P.E.
District Engineer
Resource Management Division
Lansing District Office
(517) 335-6122

mfp:jir

cc: Mr. Paul Brake, City Manager, City of Grand Blanc
Ms. Beth Smith, Clerk, City of Grand Blanc

WATER SYSTEM REVIEW

GENERAL

Basic Information

WSSN:	2740	Supply:	City of Grand Blanc	County:	Genesee
Date:	12/7/2011	Reviewed by:	MFP	District:	11

Primary Contact:	Matt Wurtz	Copy To:	Paul Brake
Title:	DPW dir.	Title:	City Manager
Telephone:	810-694-5420	Telephone:	810-694-1118
Cell Phone:		Cell Phone:	
Pager:		Pager:	
Fax:		Fax:	
e-mail:	dpwdirector@cityofgrandblanc.com	e-mail:	
Address:	203 Grand Blanc Rd. PO Box 846 Grand Blanc, MI 48439	Address:	Same

Population:	8276	Year:	2010	Basis:	2010 census

Operator Certification

Distribution Classification: S-2

Operator in Charge:	Matt Wurtz	Cert.:	S1	OP No:
Other Operators:	Mike Blom		S1	
	Tim Kehn		S1	
	William Maxheimer		S2	
	David Dunn		none	
	Brian Kelly		S-3	

Treatment Capacity: 3.96 mgd

Treatment Classification: D-2

Operator in Charge:	Matt Wurtz	Cert.	D1	OP No:
Other Operators:	Mike Blom		D1	
	Tim Kehn		D1	
	William Maxheimer		D2	
	David Dunn		none	
	Brian Kelly		D-4	

Ownership: City

Annual Fee: Active

Comments: The OIC accesses the MDEQ Operator Training Unit website to make sure that operators keep up to date with continuing education credits. The city is planning to hire one additional DPW operator.

SOURCE

Well Construction and Maintenance

Well Number	4	5	7	8
+ Well Status	st. by	op.	op.	op.
+ Treatment	Fe Rm/cl2	Fe Rm/RO	Fe Rm/RO	Fe Rm/RO
P.O.E. ID #				
+ Treatment				
Year Installed	1964			
GPS Coordinates	Lat.			
Long.				
Grouted?	yes	yes	yes	yes
Rock or Drift	rock	rock	rock	rock
Total Depth	275'	323'	303'	340'
Casing Depth	153'	130'	156'	140'
Casing Diameter	12"	16"	16"	16"
Pump Setting			165'	
+ Static Water Level	25'	35'	26'	32'
+ Pumping Water Level	92'	64'	98'	86'
+ Pumping Water Level (100 day)				
Well Log	yes	yes	yes	yes
+ Pump Type	V turb	V turb	V turb	V turb
Permit Capacity (GPM)				
Permit TDH				
+ Current Capacity (GPM	402	1100	975	970
+ Basis				
Current TDH				
HP	25	100	60	75
Last Pulled for Inspectio	1999	2005	2011	2007
Last Efficiency Test	2008	2011	2011	2011
Phase/Surge/Lightening Protection				
Well Seal	yes	yes	yes	yes
Casing 12" Above Grade	yes	yes	yes	yes
Pump to Waste Piping	yes	yes	yes	yes
+ Screened or Capped?	no	capped	screened	
Air/Vac Relief	yes	yes	yes	yes
+ Screened?	no			
Casing Vent	yes	yes	yes	yes
+ Screened?	yes	yes	yes	yes
Check Valve (VT or Sub)	yes	yes	yes	yes
Meter	yes	yes	yes	yes
Raw Tap	yes	yes	yes	yes
Chemical Injection Tap	yes	na	na	na
Plant Tap	yes	na	na	na
Chemical Feed Outlet	yes	na	na	na
Heater	yes	yes	yes	yes
Water Level Device	yes	yes	yes	yes
Pressure gauge	yes	yes	yes	yes
Floor Drain	yes	yes	yes	yes
Doors open out	in	out	out	out
Phase/Surge protection				
H-O-A Switch				
Run Timer				
Alternating Relay				

SOURCE

Standby Power

WELL AUXILIARY POWER

Well Number	5 & 8	7		
Power type	Ele. Gen	Ele. Gen		
Power Rating (kWh or KVA)				
Fuel Type	Diesel	Diesel		
Capacity (gpm)	Full	Full		
Horse Power (HP)				
Starting Frequency	weekly	weekly		
Load Testing Frequency	weekly	weekly		

PORTABLE AUXILIARY POWER None

Isolation

Well Number	4	5	7	8
GPS Coord. Lat.				
Long.				
Approved Isolation Radius	100'	100'	100'	100'
Available Isolation Radius	300'	1000'	approx. 100'	1000'
Type of Isolation Control	mun own	mun own	mun own	mun own
GW flows from/direction				
Basis				
Important Potential Source				
Distance and Direction				
Important Major Source				
Distance and Direction				
Detects				
Sensitivity				
Susceptibility				

Comments:

Both WTP's have standby power sufficient to operate the wells and the treatment systems. Each WTP also obtains its primary source of electrical power from a different substation.

The city has retain Northern Pump & Well to perform annual maintenance on each of the active production wells. Pumps and motors are not pulled during the annual maintenance; however, well efficiency tests are conducted. Pump & motors are pulled if the efficiency test indicates the need for more extensive maintenance. The stand-by wells continue to be pumped to waste on a monthly basis.

Grand Blanc has an approved wellhead protection program.

A new motor was installed for Well #7 and includes provisions to add a variable frequency drive.

SOURCE

Capacity (MGD)

Year	Pumpage & Usage Max Day	Date	Avg. Day	Min. Day	Date	Max/Avg	G/C/D	% unacct.H2O
2001	2.620		1.210			2.17	147	
2002	2.850		1.260			2.26	153	
2003	2.290		1.160			1.97	141	
2004	2.030		1.120			1.81	136	
2005	2.810		1.320			2.13	160	
2006	2.120		1.170			1.81	142	
2007	2.494		1.284			1.94	156	
2008	1.929		1.130			1.71	137	
2009	1.610		1.014			1.59	123	
2010	2.020		1.054			1.92	127	

		Date
Five Year Max. Day	2.500	
Ten year Max. Day	2.850	
Five Year Avg. Day	1.130	
Peak Hour (Hydropneumatic)		
Max Day for capacity requirements	2.500	

Total Well Capacity	3447	gpm	4.967	mgd
Firm Well Capacity	2347	gpm	3.382	mgd
Max. Day/Firm Well Capacity	74%			
Peak Hour/Firm Capacity			(Hydropneumatic w/o gravity storage)	
Total Auxiliary Power Well Capacity	3045	gpm	4.388	mgd
Aux. Power Well Capacity/Avg. Day	388%			

Basis of Auxiliary Power Waiver

Comments:
Average day water usage has changed little over the past 5 years; however, maximum day demands have decreased.

STORAGE

Construction, Controls & Maintenance

	Location: W of Saginaw	Location: E of Gas Light Ln	Location:
Volume	500000 gal	500000 gal	
Type			
O.F. Elevation			
Date Constructed	1966	1985	
Date Inspected	2005	2005	
Date Painted Inside	1990	2001	
Paint System			
NSF Std 61 Compliant (Y/N)			
Date Painted Outside	2006	1995	
Cathodic Protection	yes	yes	
Tank Isolation Valve			
Tank Drain (Hydrant)			
Altitude Valve			
Mud Valve			
High Alarm	yes	yes	
Low Alarm	yes	yes	
Type	scada	scada	
Total Head Range (Feet)			
Normal High Water Level			
Normal Low Water level			
Range of Operation			
Normal/Average Pressure			
Chart recorder			
Telemetering System			
Vents Screened	yes	yes	
Overflow Screened	yes	yes	
Access Hatches Locked	yes	yes	
Expansion Collar Lubricated			
Deflection Plate			
Overflow Splash Pad	yes	yes	
Site Fenced/Locked	yes	yes	

Capacity

Usable Storage	1,000,000	gal	1	mgal	
Total Usable Storage	1,000,000	gal	1.000	mgd	
Total Usable Storage/Max Day	40%				
Total Usable Storage/Avg. Day	88%				

Comments: Both tanks were inspected by Dixon in 2005. The Saginaw Rd tank's exterior was repainted in 2006. Repairs including a new roof vent and repainting of the dry interior was also completed. The Gas Light Ln tank's exterior coating system is in poor condition and needs to be repainted. The city has not budgeted for the work thus far. Both tanks are controlled by the city's SCADA system.

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies? (Y/N) no
No. of Emergency Connections 3 - with Grand Blanc Twp.

Location	Main Size	Est. Capacity	Metered?	Status (Regular/Emergency)	WSSN of Connection
Kings Pointe	8"		no	emergency	2745
Holly Rd	12"		no	emergency	2745
Saginaw Rd	12"		yes	emergency	2745

If emergency, are valves exercised annually? (Y/N) no
Flushed? (Y/N) no

Comments:

Grand Blanc city and Grand Blanc Township have a verbal agreement to utilize the emergency interconnections; however there is no written agreement.
The Saginaw Rd connection was used in 2010 to prevent a loss of pressure in a portion of Grand Blanc Twp's system during repair of a broken watermain.
Further discussion with both utilities revealed that all 3 interconnections are in need of maintenance and possible repair. It also appears that ownership of the connections is unclear. Some degree of repair along with a routine maintenance program are needed in order to keep these connections in good operating condition; however, the city and the township need to determine the line of responsibility for completing. this work.

Distribution Piping

Identify distribution piping materials - estimate percentages:

Cast Iron	19 %
Ductile Iron	80 %
PVC	1 %
AC	%
HDPE	%
Galvanized	%
Concrete	%

Estimated percent of piping with coal tar lining 0 %

Identify distribution pipe sizes - estimate percentages:

2"	0	0%
4"	1450 LF	0.70%
6"	109,800 LF	49.70%
8"	65,000 LF	29.50%
10"	450 LF	0.20%
12"	43,700 LF	19.80%
16"	300 LF	0.10%

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? (Y/N) no

Are there areas where aesthetic water quality complaints are frequent? (Y/N) no

Do you receive complaints alleging illness due to the water? (Y/N) no

Are there areas where customers complain of low pressure? (Y/N) no

Are there areas where fire flows cannot be maintained? see comment

Comments: Additional improvement in fire protection was achieved in most areas due to water main replacements. The majority of the 4-inch watermains have been replaced with larger sized mains Any remaining 4-inch mains are less than 300 feet from larger sized mains.

The 2011 Reliability Study identified several commercial/residential areas within the city's distribution system having less than the 2500 gpm at 20 psi recommended fire flow.

Last ISO report date: 9/7/2005 Rating 3

DISTRIBUTION

Operational Concerns & Maintenance

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading, or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

Location:	Estimated Completion Date
Hattie *	One block of 4-in main to be repl
West *	One block of 4-in main to be repl
Terrace - Grant St	Replace 6-inch cast-iron

* Existing mains in Hattie and West streets need to be replaced to improve flows for fire protection.

The 2011 Reliability Study has identified the need to replace mains in several commercial areas, apartment complexes, and at the Grand Blanc Community schools in order to provide the desired level of fire protection. A list of recommended distribution system improvements is included in the study. The city will need to establish a capital improvements program in order to achieve the level of fire protection discussed in the study.

DISTRIBUTION

Hydrants

Number of Hydrants	419
Number Without Auxiliary Shut-Off Valves	0%
Number that are Self-Draining	60%
Number of Inoperable Hydrants	0

Frequency of Hydrant inspection: 1/yr

Inspection Staff: DPW

Comments:

Water mains are flushed once per year.

Are there areas where additional hydrants are needed? no

Hydrant location system: Gen plan Accurate? Yes

Are hydrants color coded for capacity? no

Has this information been provided to the fire department? yes

Frequency and seasons of hydrant flushing: 1/yr spring or fall

Purpose of flushing: hydrant maintenance and main flushing

Is the public notified prior to flushing? yes

Does flushing follow a specific format? yes

Is the volume of water used during flushing estimated? yes

Is a record maintained of hydrant activities? yes

Comments:

The DPW has a binder with records and locations for hydrants and valves. Hydrant information is also stored in the city's GIS system.

DISTRIBUTION

Valves

Number of Valves: 516

Number of inoperable valves: 0

Are there areas where additional valves are needed? yes

If yes, list locations:
Additional valves are needed in the older residential areas.

Valve location system: valve log Accurate? yes

Valve Turning Frequencies: a turning program is being considered

Primary:

Others:

Records Maintained? yes

Comments:

The DPW has a binder with records and locations for hydrants and valves. Valve information is also entered into the city's GIS system.

DISTRIBUTION

Customer Service Information

Number of service connections	2612
Number of metered service connections	100%

Identify service line materials and estimate percentages:

Copper	100%
PVC/PE/PB	0%
Galvanized	0%
Lead	0

Ownership of Service	(CWS/Customer)
From Corp Stop to Curb Stop	city
From Curb Stop to Property Line	customer
From Property Line to Meter	customer
Meter	city

In addition to the 2600 service connections, there are approximately 500 connections for irrigation.

Customer Meters

Types of meters Used	inventus, senus & rockwell
Number of Meters with Touch Pads or Other Remote Reading Devices	95%
Size of Meters	
Residential	3/4" - 1"
Industrial/Commercial	1-8"
Meter Testing/Maintenance Program	1.5" and larger tested every 3 yrs
Average Age of Meter is System	not determined
Residential/Commercial/Industrial	
Criteria for Changeout	accuracy
Number or Percent Changeout per Year	5%
Master Meter Locations	
Calibration of Master Meters	

Meter Reading Staff/Contract: DPW

Percent By Usage	
% Residential	75%
% Commercial	15%
% Industrial	10%
% Other	

% Large Users - List	
	General motors
	Grand Blanc Schools
	River Bend Nursing Home
	Pro Clean Dry Cleaner
	Perry Place Apts
	Sunset Apts
	Country House Apts

Comments: Meter testing is performed on larger customer meters. Residential meters are tested if a customer challenges a high read. Also, any older meters (non-touch-pad) are replaced when found. The city is considering to upgrade the meter system to a fixed-base meter read system. The system, consisting of a 2-way radio read, would allow all meters to read from a single location and hourly usage be monitored.

DISTRIBUTION

System Growth

Year	No. of Residential Meters Installed	No. of Comm./Industrial Meters Installed	No. of Construction Permits Issued	Permitted Amount of WM Feet
2001			2	1910
2002			1 sub phase	900
2003			RO treatment	
2004			1	884
2005			2 subs, 1 phase	4500
2006			0	0
2007	0		1	775 - wm repl
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0

Water Rates

What is your current rate schedule?	$2.50 per 100 cf
Are current rates adequate to support O&M and CIPS?	yes
When was last time rates were adjusted?	Su. 2010
Has a water rate study been performed? When?	2003
Is there a meter charge or ready to serve charge?	$11.00/2-mo for ready to serve
Is a copy of the water rate schedule and ordinance available?	yes - on line

Comments: There has been virtually no residential or commercial development since 2006.
Water rates were increased in 2010 and the increase was based on the 2003 rate study
$1500 tap-in fee/ unit for the first 2 units and $800/unit for each unit thereafter.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	100' of 12", 140' of 8", 200' of 6", 60' of 4"
Repair Clamps (2 or more for each size)	50 of assorted sizes
Tees, Crosses & Elbows	many
Hydrants	6 new, 14 old for parts
Valves	many
Services (Corp & Curb Stops, Clamps and Lines)	many
Other	

Safety Issues

Confined Space Entry Program in Place % Followed (Y/N)	yes
Trench Safety Program in Place & Followed (Y/N)	yes

Comments:
The city is built-out and there has not been any new watermain extensions or additional customers.

PROGRAM COMPLIANCE

Cross Connection Programs

Ordinance No: 78 Date: 5/29/1973

Approved Program (Y/N)? yes Date:

Staff Assigned to Program: (No., Dept and/or who) DPW

Is Annual Cross Connection report required (Y/N)? yes

Was previous year's annual report received (Y/N)? yes Date Received: 3/16/2011

Was previous year's annual report acceptable (Y/N)? yes

Inspection Status: Active, high hazard accounts inspected 1/yr, low hazard accounts inspected 1/2yrs

Device Testing Frequency: see comments

Recordkeeping: A list of the cross connection accounts is available

Private Well Isolation/Abandonment Procedure:

Comments: The DPW maintains a prioritized list of accounts where cross connection inspections are completed each year, Service line protection has been provided at the GM facility. The RPZ is located in an above ground building. GM continues to conduct device testing on all internal devices and provides the city with copies of the test reports.

The local schools added a venturi type device on all their janitorial sinks to control the use of soap. The device created a cross connection, thus the city mandated full protection at each use point. The city has confirmed that full protection has been provided on all janitorial sinks.

Annual Pumpage Reports

Is Annual Pumpage Report required (Y/N)? No

Was previous year's annual report received (Y/N)? No Date Received: see comment

Copies of the 2008 - 2010 reports will be provided.

Monthly Operator Reports

Are Monthly Operation Reports required (Y/N)? yes

Were all previous year's reports received (Y/N)? yes Timely? yes

Are previous year's reports acceptable (Y/N)? yes

Consumer Confidence Reports

Is the annual CCR requires? (Y/N) yes

Was the previous year's report received? (Y/N) yes Timely?

Was the previous year's acceptable? (Y/N) yes

Was the previous year's certification form received? (Y/N) yes Timely?

PROGRAM COMPLIANCE

Contingency Plan

Date of Most Recent Plan: 6/28/2005 Acceptable? ERP needed

Filed where? MDEQ, DPW

The 2005 contingency plan needs to be updated into an Emergency Response Plan.

General Plan

Date of Most Recent Plan: Oct-08 Acceptable? Yes

Filed Where? MDEQ, DPW

Reliability Study

Date of Most Recent Study: 2011 Acceptable? Yes

Comments: The city completed a water system reliability study as requested. The study identified various distribution system improvements in order to achieved the desired level of fire protection in all areas. The reliability study meets our requirements.

Permits

Applies for and obtains permits prior to construction (Y/N): _____
Reviews plans from engineers and/or developers prior to submittal to DEQ (Y/N): _____
Standard specifications on file at CWS (Y/N): _____
If applicable, adheres to contract with supplier regarding plan submittal (Y/N): _____
Follows master plan for any construction (Y/N): _____ Date of Last Master Plan: _____
Actually follows plans as permitted (Y/N): _____
Develops as-built plans (Y/N): _____
Updates general plans (Y/N): _____

Capacity Development

	Submitted	Acceptable
Technical Capacity		
Site and/or general plan		
System reliability addressed-dual feeds, standby power, storage		
Purchase agreement		
Financial Capacity		
Acknowledgement of annual fee		
Annual budget plan for next 5 years		
Sources of revenues (rates, fees, etc.)		
Planned expenses (O&M, administrative, engineering, accounting debt service)		
Capital improvements costs/account & plans		
Capital replacement account and plans		
Documentation of acceptance repayment plans from lending and bond authorities		
Managerial Capacity		
Chain of command and clear lines of responsibility		
Sample site plans		
Acknowledgement of monitoring costs		
Cross connection control program		
Standard Specifications		
Plans/Methods for providing legal doctrine (ordinances, policies, plans)		
Customer complaint handling format		
Operator training program		

MONITORING

Bacteriological

Date of Approved Site Sampling Plan	2006
Are samples still being collected in accordance with the plan? (Y/N)	yes
Number of samples required each month	9
Basis for Setting Number of Monthly Samples:	pop
Certified Lab Used:	MDEQ
MCL, Monitoring or Reporting Violation(s)? (Y/N)	no
Number & Type of Violations in past 12 months	
Public Notice Issued according to regulations? (Y/N)	na

The 2006 sampling site plan needs to be updated. The DPW samples during the first 3 weeks of the month.

Chemical

Date of Monitoring Schedule	2/14/2011		
Are samples still being collected in accordance with the schedule? (Y/N)	yes		
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)			
If nitrate detect, what is concentration?	ND	Sample Site	
If nitrite detect, what is concentration?	ND	Sample Site	
Detects for metals > 50% of MCL? (Y/N)	Yes		
Metals (list)	Arsenic at Well #4 (5 - 8 ppb)		
Detects for VOCs (Y/N)	no		
Detects for SOCs (Y/N)	no		
Date of Approved Disinfection Byproduct Monitoring Plan			
DBP Sampling Done? (Y/N/Waived)			
If yes, done to site sampling plan? (Y/N)			

Lead and Copper Monitoring

No. of Samples Required:	20		
Semi Annual/Annual/Triennial	triennial		
Exceedance of lead or copper action level (Y/N)	no		
If yes, was public education issued (Y/N)		Date Issued:	
Next Monitoring Period:	6/1/2013 9/30/2013		
Corrosion Control Program, if applicable			
Lead service line replacement status, if applicable			

Radiological Monitoring

Date of Monitoring Schedule	2011		
Are samples still being collected in accordance with the schedule? (Y/N)	yes	Date Collected	
Alpha, beta, radium, uranium		Date Collected	7/14/2011
Radon		Date Collected	
Tritium		Date Collected	

Detects for Rads > 50% of MCL? (Y/N)

If yes, list

WTP 5&8 - Gross Alpha 3.22 piC/L
Ra - 226: 1.05 piC/L
Ra - 228: 2.33 piC/L

Well #7 - 5/22/2001 Gross Alpha: <3 piC/L
Ra - 226: 0.5 piC/L
Ra - 228: <0.8 piC/L

Evaluation of Community Water Supply - Water System Review Summary				
Name of Supply: City of Grand Blanc			WSSN:: 2740	
County: Genesee			District: 11	
Evaluator: MFP			Date: 12/14/2011	
Overall Rating Satisfactory: X		Marginal:	Deficient:	
	N/A	Sat.	Marg.	Def.
General				
Operator Certification		X		
Ownership	X			
Source		X		
Well Construction & Maintenance		X		
Standby Power		X		
Isolation		X		
Capacity		X		
Storage		X		
Construction		X		
Controls		X		
Maintenance - Gas Light Ln ele. tank ext. needs re-coating			X	
Capacity		X		
Distribution		X		
Interconnections with other Supplies		X		
Pump Stations	X			
Operational Concerns & Maintenance		X		
Hydrants		X		
Valves		X		
Customer Service Information		X		
Program Compliance		X		
Cross Connections		X		
Annual Pumpage Reports/MORs		X		
CCR		X		
Contingency Plan.		X		
General Plan		X		
Reliability Study		X		
Permits				
Capacity Development				
Monitoring		X		
Bacteriological		X		
Chemical		X		
Lead/Copper		X		
Radiological		X		
Treatment		X		
Disinfection		X		
Phosphate Addition	X			
Fluoride	X			
Iron/Manganese Removal		X		

Iron Removal Plant Sanitary Survey

Name of Supply: City of Grand Blanc

Date: 12/7/2011

WSSN: 2740

Reviewed by: MFP

Address:
203 Grand Blanc Rd
PO Box 846
Grand Blanc, MI 48439

Plant Address: Three iron removal treatment facilities located at:

IR Plant (Well 4)
12412 Via Catherina

RO/IR Plant (Wells 5 & 8)
1301 Bush Creek Dr

RO/IR Plant (Well 7)
231 Jewett Trail

Telephone #'s:

Plant:	none
WTP Fax	none
City Hall	810-694-1118
DPW	810-694-5420

City Officials:

Mayor:	Susan Soderstrom
City Manager:	Paul Brake
Clerk:	Beth Smith

Certified Operators:

Water Treatment Plant:

Supt-	Matt Wurtz - dpwdirector@cityofgrandblanc.com
Operators-	Mike Blom, Tim Kehn and William Maxheimer

Pop. Served: 8276

% Metered: 100%

Construction Features and Dates:

IR facilities at Well 4 and 7 were constructed in 1992. IR facility at wells 5 & 8 was constructed early in 1993. RO membrane softening was added in 2004 (IR 7 and 5&8). Both facilities continue to produce water that meets the treatment objectives without any major treatment problems.

IR plants #5 & #8 and #7 are refered to as WTP 5&8 and WTP 7

The IR facility at well 4 does not have RO softening and the facility is now used for emergency stand by.

Plant Design Capacity:

Plant capacity is based on a filtration rate of 3 gpm/sqft

Plant Rated Capacity:

IR plant well 4:	432 gpm/0.622 MGD
WTP 7:	850 gpm/1.22 MGD
WTP 5&8:	1600 gpm/2.3 MGD

Total Treated Water Storage:

At plant site, WTP (5&8):	30000	gal
At plant site, WTP (7):	20000	gal
Distribution:	1000000	gal
Total:	1050000	gal
% max day:	42	

Source of Water

Name of Source:	Well 4	Well 5	Well 7	Well 8
Capacity (gpm):	402	1100	975	970
Characteristics:	ground water	ground water	ground water	ground water

Stand By Sources	Well 2
Capacity (gpm):	420
Characteristics:	ground water

Emergency Supply: Three interconnections with Grand Blanc Twp

Water Quality

MOR's:

	Raw		Treated	
	Average	Range	Average	Range
Iron (ppm)	0.5	0.3 - 0.6	<0.05	0.00 - 0.05

Comments: Iron concentrations are being recorded in the MOR's.

Monitoring Requirements: Monitoring requirement can be referenced in the city's annual monitoring schedule prepared by the MDEQ.

Iron Removal Plant Facilities:

Raw water metering:

Water flow is metered at each wellhouse and at each plant tap or point of entry into the system.

Meter type: Rockwell International propeller meters are provided at each wellhouse. A new mag-meter has been ordered for Well #7 and will be installed early in 2012.

Pumps and Pump Locations

Well Sources:

Well	HP	Type
4	25	V. Turb
7	100	V. Turb
5	100	V. Turb
8	100	V. Turb

Firm Capacity: 3.42 MGD

High Service:

IR Plant 4	WTP 7	WTP 5&8
One centrifugal pump rated at 432 gpm.	Two centrifugal pumps rated at 1000 gpm.	Two centrifugal pumps rated at1800 gpm.

Firm Capacity: 3.52 MGD

Backwash:

Water from the in service filters is used for backwash.

Conditions of Pumps:

The impeller in the high service pump at plant 4 was replaced in the early 2000s due to severe corrosion. This was believed to be caused by the chlorine service pump. The pumps at the other treatment facilities are in good working condition. The chlorine feed points were relocated to the WTP clearwell thus, the chorine is adequately mixed prior to reaching the pumps.

Each of the pumps (except IR Plant 4) are VFD controlled.

Source of Backwash: Water from the in-service filters.

Disposal of Backwash Water: sanitary sewer

Sludge: NA

High Service Metering: New Sensus propeller meter at well 4
Rosemount mag meters at WTPs 5&8 and 7

Location of Switch Gear: Wellhouse

Susceptibility to flooding: Minimal

IR Plant #4 is backwashed 1/wk mainly to expand the filter media to keep it functional in the event that the facility needs to be used. The facility is also operated once a month for approximately a half hour.

Pretreatment Facilities

	IR Plant 4	WTP Plant 7	WTP Plant 5&8
Type	draft aeration, detention	draft aeration, detention	Same as 7
Number of Units:	1 - 65 inch dia aerator	1 - 99-inch dia aerator	1 - 120 inch dia aerator
Rated Capacity (gpm):	432	1000	1800
Detention Time (min):	20	20	20
Tank Size (gal):	8640	19440	35000
Inlet Design:	Float operated butterfly valve type lever control		
Outlet Design:	Monoflange rubber seated butterfly valve.		
Overflow:	4"	Overflows to the backwash sump	
Drains:	4"	Drains to backwash sump	
Condition	The 2011 inspection confirms that the treatment plants are well maintained and appear to be in good condition.		

Filtration

	Plant 4	WTP 7	WTP 5&8
Number of Filters:	4 cells	4 cells	4 cells
Area of Filters (sq. ft):	144	324	576
Design Filtration Rate (MGD)	0.622	1.44	2.59
	3 gpm/sq ft	3.08 gpm/sq ft	3.12 gpm/sq ft
Filter Media:	Same as Plant 5&8	Same as Plant 5&8	24" anthracite over supp. Bed
			-3" sand 3/4-1/2"
			-2" sand 1/2-1/4"
			-2" sand 1/4-1/8"
			-2" sand 1/8-#16
			UN Coeff: 1.7
			Eff. Size: 0.6-0.8 mm

Date Last Rebuilt or Checked:

The iron-removal treatment facilities were constructed in 1993. The filter media was inspected. in 2006 by a private consultant, Floran Co and DPW staff conduct yearly inspections. Typical problems including media-loss, cementing, growth, etc have not been noted during the annual inspections.

Floran Co. also determined that the filter media was a candidate for chemical cleaning, if needed; however, disposal of the spent cleaning agent to Genesee County and maintaining compliance with the county's IPP requirements rules this option out.

Underdrain Type:

Ceramic filter laterals

Backwash Requirements:

Values are listed for IR plant 4, WTP 7 and 5&8 respectively
-air problems - none
-backwash rate - at 432, 972, 1800 gpm (12 gpm/sq ft)
-normal length of wash - 35 min 15000, 34000, 75000 gal per wash
-disposal of backwash water - sanitary survey
-criteria used for backwash - filter loss of head indicator (1/week minimum)

Rate of Flow Devices:

Calibrated V-notch weir (backwash)
Mk 515 Rotor-paddle wheel flow sensor (filtered water)

Length of Filter Runs: One week

Filter to waste: Sanitary sewer

Associated Problems/Causes:

Mudballs - None
Air Binding - None
Cementing - None
Gravel Mounding - None
Media Loss - None since repairs to WTP 7
Cracking - None
Media Growth - None
Media Attrition - None
Bacteria growth - None
Uniform backwash - None
General Problems - None have been noted, WTP operators inspect the media on a yearly basis.

Chlorination

Gas Chlorination is provided at all three treatment plants. The chlorination system utilizes a series of Wallace and Tierman V-100, V-notch chlorinators rated at 5 to 20 lbs/day. Also a 2 dual tank design with automatic switch over is provided.

Cl Safety Features/Summary:

Air Pack	30 min supply
Cl Leak Alarm	yes, set to 1 ppm
Leak Detection Bottle	yes, ammonia bottle
Cylindar Restraint	yes
Door Opens Outward	yes
Panic Hardware	yes
Inside Access	no
Outside Access	yes
Repair Kit	yes
Switches	next to obs window
Ventilation	yes
Window	yes
Heater	yes, electric

Fluoride: Not applied

Chemical Feed Dosage Determinations:

Cl feed rates are determined by noting the pounds of chlorine gas used and the amount of water treated. Chlorine dosage is also measured using a Hach test kit.

Plant Piping and Miscellaneous

Pipe Diameter, Identification, etc.

Low Service Discharge	Green
Filtered Water	Blue
High Service Discharge	Dk. Blue
Backwash	Lt. Green
RO Permeate	Md. Blue
RO Concentrate	Lt Brown
Waste	Brown
CIP	Orange

Plant Controls:

A SCADA system is in place with control equipment installed at both tanks, all 5 well locations and the iron removal facilities. In addition, a distribution system location for pressure recording and a location within the sanitary sewer for backwash measurements is provided. This information is relayed back to the main control panel at the DPW office.

Metering:	Flow rate and totalizer are monitored and controlled at the DPW building.
Chem Feed:	Controlled from the DPW
Filters:	Status of operation are monitored and controlled from the DPW.
High service pumps:	Controlled from the DPW.

Alarms:

Cl Leak	Audible at 1 ppm
Low Service Well	Pump and Power Failure
Elevated Tank Low Level	yes
Elevated Tank High Level	yes
Elevated Tank Loss of Signal	Power fail alarm.
Security	Entry alarms are provided at each treatment facility and at each elevated tank. All sites are also fenced and all entrance gates are locked.

Flexibility in Operation:

	Unit Bypass	Plant Bypass
Pretreatment	no	yes
Filters	no	yes

Piping Structural Integrity: Good Cond

Roof Drains: Roof gutters with downspouts

Interruptions in Operation: None

Low Pressure Reverse Osmosis (WTP - #5&8)

Type of Units: Osmonics Model: RO Muni - 300
Date Installed: Jun-04

No. of CMF Skids/Arrays: 3 No. of Modules/CMF Unit: 12 modules - 6 elements per module
Extra Modules Onhand (Y/N): No
No. of Extra Modules: None

Method of Providing PLC Redundancy: Each unit has back-up PLC.

Maximum Approved Transmembrane Pressure: _____ PSI
Maximum Operating Transmembrane Pressure: _____ PSI

Maximum Approved Filtration Flux Rate (w/units): _____ gpm/m^2 _____ $gals/ft^2/day$
Maximum Operating Filtration Flux Rate (w/units): _____ gpm/m^2 16-18 $gals/ft^2/day$

Membrane Influent Capacity: 360 GPM per skid
Membrane Permeate: 290 GPM per skid
Membrane Concentrate: 70 GPM per skid

Cartridge Filter Feed Pumps:

3 Horizontal Split Case pumps rated at 353 GPM @ 80 Ft TDH

Membrane Feed Pumps:

Number: 3 Type: HC
Capacity: 353 gpm TDH: 347ft
Capacity: Total: 1059 gpm Firm: 720 gpm
Treatment Rate/Module: 360 gpm

Blend Pumps:

2 vertical split case pumps each rated between 250 and 650 GPM @ 3.5 to 14.0 Ft TDH. The blend pumps are controlled by the WTP PLC and are operated by a variable frequency drive control unit.

No. of Prefiltration Strainers: 9 (three in series per skid)

Type of Strainers: Cartridge Filters Self/Manual Cleaning: Disposable
Size of Units: 40 X 6 - inch Mesh Size: 1 Micron
Cross Connection Protection of Auto Cleaning Systems (Y/N): Yes

Each cartridge filter contains 7 internal filters. The cartridge filters are replaced every two months or if stain begins to bleed through. These filters are located ahead of the RO system and they protect the RO membranes.

Membrane Comments:

Each of the three membrane skids contains 12 modules. Treatment in each skid is provided in three stages. Stage 1 passes water through the first six modules, Stage 2 treatment passes concentrate from Stage 1 through the next 4 modules. Stage 3 treatment treats the concentrate from Stage 2 through the last 2 modules. The overall recovery rate was reduced from 87% to 81% in order to reduce the rate of scaling on the third stage membranes. 360 GPM of influent results in approximately 290 gpm of permeate from each membrane skid.
The treatment plant normally operates with 2 skids on-line.

Laboratory/Analytical Equipment

Chlorine, Iron: Hach DR 2400
Arsenic: Hach. Cat 280000
Hardness, Chloride: Hach 16900 Digital Titrator

Air Compressors: Number: 2 doubles HP: 5
SCFM: 23 PSI: 120

2 dual air compressors are provided to operate the pneumatic controlled valves.

Clean in Place (CIP) System

Chemical(s) Used: CIP soln - Avista RoClean L403 and L211 (low pH and high pH)
Recirculating Pump(s): No.: 1 TDH: 64 feet Goulds Pump
GPM: 225 HP: 15
Volume of Solution Tank: 7 ft dia. X 7 ft 1000 gallons

Cross Connection Protection Between Arrays/Units for CIP Piping (Y/N): Yes
Hours of Operation Between Chemical Cleanings: Based on differential pressure
Full Restoration of TMP? (Y/N): Yes If No, Describe: Stage 3 modules were replaced and function as designed.

The CIP system uses RoClean liquid cleaner supplied by Avista. The L403 is a low pH cleaner and the L211 is a high pH cleaner, both NSF Std 60 approved. The CIP piping system has been modified by WTP staff to allow sequential cleaning of each stage; thus' preventing additional fouling of the third stage membranes. Sequential cleaning is accomplished by installing temporary piping from the CIP tank to each individual stage of membranes. Valving changes were also made to isolate each stage for separate cleaning. The piping and valving alterations and the modified method of cleaning has performed well and the improvements have eliminated additional fouling of the third stage membrane that was recently replaced. WTP staff also heat the CIP solution to approximately 115 deg F which has demonstrated more effective cleaning of the RO membranes. The frequency of CIP is approximately once every 7 months.

Prior to discharge of the spent CIP, ferric chloride is added to coagulate the concentrated iron and arsenic. The flocc is passed through seven 0.1 micron filters with a 1.5 HP dewatering pump. The filters are a post filter housing Model HX0740 - 3.0V-316-A Caustic soda is also added to the spent CIP solution for pH adjustment in order to meet Genesee County's discharge requirements.

Operation:
Hours Per Day Operator Attendance: 5 days per week (4 - 8 hours/day)
Sat & Sun - 2.5hrs/day

Low Pressure Reverse Osmosis (WTP - #7)

Type of Units: Osmonics Model: RO Muni - 300

Date Installed: Jun-04

No. of CMF Skids/Arrays: 2 No. of Modules/CMF Unit: 12 modules - 6 elements per module
Extra Modules Onhand (Y/N): No
No. of Extra Modules: None

Method of Providing PLC Redundancy: Each unit has back-up PLC.

Maximum Approved Transmembrane Pressure: _____ PSI
Maximum Operating Transmembrane Pressure: _____ PSI

Maximum Approved Filtration Flux Rate (w/units): _____ gpm/m^2 _____ $gals/ft^2/day$
Maximum Operating Filtration Flux Rate (w/units): _____ gpm/m^2 16-18 $gals/ft^2/day$

Membrane Influent Capacity: 360 GPM per skid
Membrane Permeate: 290 GPM per skid
Membrane Concentrate: 70 GPM per skid

Cartridge Filter Feed Pumps:

2 Horizontal Split Case pumps rated at 353 GPM @ 65.5 Ft TDH

Membrane Feed Pumps:

Number: 2 Type: HC
Capacity: 353 gpm TDH: 347ft
Capacity: Total: 720 gpm Firm: 360 gpm
Treatment Rate/Module: 360 gpm

Blend Pumps:

2 vertical split case pumps each rated between 250 and 650 GPM @ 3.5 to 14.0 Ft TDH.

No. of Prefiltration Strainers: 6 (three in series per skid)
Type of Strainers: Cartridge Filters Self/Manual Cleaning: Disposable
Size of Units: 40 X 6 - inch Mesh Size: 1 Micron
Cross Connection Protection of Auto Cleaning Systems (Y/N): Yes

Each cartridge filter contains 7 internal filters. The cartridge filters are replaced every two months or if stain begins to bleed through. These filters are located ahead of the RO system and they protect the RO membranes.

Membrane Comments:

Each of the two membrane skids contains 12 membrane modules. Treatment in each skid is set-up in a 6:4:2 configuration similar to WTP #5 & #8. In a similar fashion to WTP #5 & #8, the recovery rate was reduced to 81%.

Laboratory/Analytical Equipment

Chlorine, Iron: Hach DR 2400
Arsenic: Hach. Cat 280000
Hardness, Chloride: Hach 16900 Digital Titrator

Air Compressors: Number: 2 doubles HP: 5
SCFM: 23 PSI: 120

2 dual air compressors are provided to operate the pneumatic controlled valves.

Clean in Place (CIP) System

Chemical(s) Used: CIP soln - Avista RoClean L403 and L211 (low pH and high pH)
Recirculating Pump(s): No.: 1 TDH: 64 feet Goulds Pump
GPM: 225 HP: 15
Volume of Solution Tank: 7 ft dia. X 7 ft 1000 gallons

Cross Connection Protection Between Arrays/Units for CIP Piping (Y/N): Yes
Hours of Operation Between Chemical Cleanings: Based on differential pressure
Full Restoration of TMP? (Y/N): Yes If No, Describe:

The CIP system uses RoClean liquid cleaner supplied by Avista. The L403 is a low pH cleaner and the L211 is a high pH liquid cleaner, both NSF Std 60 approved. The piping and valving modifications were completed at WTP #7 in the same manner that they completed at WTP #5 & #8. Operators also heat the CIP solution for more effective membrane cleaning.

Prior to discharge of the spent CIP, ferric chloride is added to coagulate the concentrated iron and arsenic. The flocc is passed through seven 0.1 micron filters with a 1.5 HP dewatering pump. The filters are a post filter housing Model HX0740 - 3.0V-316-A. Caustic is added to the spent CIP solution for neutralization prior to discharge to the sanitary sewer.

Operation:
Hours Per Day Operator Attendance: 5 days per week (4 - 8 hours/day)
Sat & Sun - 2.5hrs/day

CHEMICAL FEED

CHLORINE (Both WTPs)

Chemical supplied: 150 pound gas cylinders

UL/NSF approved? Yes

Dosage: CL2 dosage (pre-clearwell) is approximately 0.5 - 0.6 mg/l

Supplier: Alexander Chemical

Chlorine Feed Point:

1) Blend water line prior to clearwell
2) Applied (prior to filters - not typically used)

Type of Feeders: V-100 Wallace-Tiermann chlorinator rated at 0-20 lbs/day

Chlorine Room Description: The chlorine feed room is located in a separate room from the treatment plant with exterior access.

CL2 Application Measurement:

The pounds of chlorine used is determined by a Wallace-Tiermann Series 50-350 digital scale.

Chlorine Safety Features/Summary:

The chlorine room is self-contained and is equipped with leak detection, chlorine alarm, exhaust fans and panic hardware.

NSF Approved - Yes
Leak Detection Bottle - Yes

Caustic Soda **(Both WTPs)**

Chemical supplied: 25% Sodium hydroxide

UL/NSF approved? Yes - Alexander Chemicals

Dosage: 13 mg/l average application

Chemical feed point: Finished water

Chemical feeders: 4 positive displacement metering pumps (includes two alternate pumps at each WTP)

model	max feed rate
Premia 75	10 gph @ 50 psi - @ #5 & #8
	5.5 gph @ 50 psi - @ #7

Chemical feed dosage determination: The amount of sodium hydroxide used is set to accomplish a finished water pH of 8.0. The volume used is determined by use of a Miltronics Mini Ranger Plus transducer mounted on top of the day tank. The bulk storage tank has a remote digital reader. A calibration chamber is provided for feed determination.

Chemical Storage: One 6000 gallon bulk storage tank and one 250 gallon day tank. Caustic is gravity fed from the bulk storage tank to the day tank. Product from the bulk storage tank can be fed by gravity to the day tank if the bulk storage tank is more than half full. A transfer pump can also be used to fill the day tank. WTP #7 has a 200 gallon day tank.

Spill protection: The bulk storage tank and day tank have adequate containment. The bulk storage tank is re-filled approximately three times a year.

Anti Scalant: **(Both WTPs)**

Chemical supplied: Avista Vitech 3000

UL/NSF approved? Yes

Dosage: 2.0 mg/l average application

Chemical feed point: Prior to membrane treatment

Supplier: Avista

Chemical feeders: Seven metering pumps rated between 0 - 4.0 gph.

model	max feed rate
Premia 75	0.45 gph @ 250 psi

Three pumps operate at WTP #5 & #8, two pumps operate at WTP #7. Each WTP also has a spare pump.

Chemical feed dosage determination:

Chemical day tank is located on top of a digital weigh scale - Model XT10PS - MA.

Chemical Storage: 3 - 45 gallon day tanks at WTP #5 & #8, 2 - 45 gallon day tanks at WTP #7.

3890

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 1, 2014

Mr. Scott Fairbanks, DPW Superintendent
City of Linden
132 East Street
P.O. Box 507
Linden, Michigan 48451-0507

WSSN: 03890

Dear Mr. Fairbanks

SUBJECT: City of Linden - Water System Sanitary Survey

This letter will confirm my visits with you on March 13 and March 19, 2014, and summarize the subsequent review and discussion of the water supply facilities serving the city of Linden. The purpose of the visits was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). In addition, the enclosed Water System Review form was updated to gather information on the city of Linden water supply system.

The survey noted that the city is upgrading their water meters to a radio-read system and the change-out is approximately 25% complete. Once again, we encourage the city to complete the upgrade to radio read as it will significantly reduce the time needed to conduct routine meter reads and will help to improve customer service.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	Recommendation made
Treatment	Recommendation made
Distribution System	**Deficiency Identified**
Finished Water Storage	Recommendation made
Pumps	No Deficiencies/recommendations
Monitoring & Reporting	No Deficiencies/recommendations
Management & Operations	Recommendations made
Operator Compliance	Recommendation made
Security	No deficiencies/recommendations
Financial	Recommendation made
Other	No deficiencies/recommendations

The following deficiency is a violation of Act 399 and must be resolved in order to return the water system to compliance.

R. 325.11404 requires a water utility to develop a comprehensive program for the elimination and prevention of cross connections. The cross connection control program (CCCP) must also include the local authority to implement the program, typically by a local ordinance.

The city of Linden was requested to update their CCCP and ordinance (Ordinance N. 58), adopted in 1973, in our previous correspondence; however, this effort has not been completed. As we discussed in our April 11, 2011, April 16, 2013, and August 1, 2013, correspondence, the ordinance needs to be updated to include the requirement for device testing and the CCCP needs to be updated to reflect the current device testing frequency. Specifically, the frequency for testing all testable backflow prevention devices has increased from once every five years to once every three years.

Appendix A of the Cross Connection Rules Manual – 4th Edition, contains a suggested model ordinance and Appendix C contains a model CCCP. These examples can be used for updating Linden's CCCP and local ordinance. A draft version of the updated ordinance and program should be sent to us for review and comment prior to being adopted. The city needs to have an updated CCCP and ordinance in place by no later than June 30, 2014.

There also appears to be a higher number of low hazard commercial accounts eligible for routine cross connection inspections compared to the number provided in the annual cross connection report. The updated CCCP should also include any additional low hazard accounts that are identified.

Finally, we have not received a copy of the 2011 and 2012 annual cross connection reports. Please send us a copy of the reports with submittal of the 2013 cross connection report.

It is hoped that the following recommendations will prove useful in enhancing the operation and maintenance of your water supply.

1. Proceed with routine maintenance and cleaning of Wells #1, #3 and #4. Preventative maintenance and/or repairs are needed for these wells in order to maintain adequate source capacity and reliable operation. It is our understanding that the city plans to proceed with well maintenance on Well #3 followed by chemical cleaning of Well #1 and routine maintenance on Well #4. A proactive well maintenance program is encouraged since this will help to protect city's investment in source capacity.

   As part of the work for Well #3, well house appurtenances including the pressure gauge and water level device need to be replaced. Also, the casing vent should be modified in order to confirm the integrity of the casing vent screen.

2. Perform an internal inspection of both elevated tanks and re-coat the 150,000 gallon elevated tank's interior and exterior. It is our understanding that the bid documents for the work are being revised such that the work can be placed out to bid within the next two months (May 2014). Please confirm this. As we discussed, routine inspections and periodic re-coating of the elevated water storage tanks are essential in maximizing their useful service life.

3. Provide us with a draft copy of the updated water system Reliability Study (RS) for review and comment. It is our understanding that additional information is being provided to your consultant, HRC, in order to complete the updated study. Please provide us with a draft copy of the updated RS when it becomes available for our review and comment.

4. Update the 2006 water system General Plan (GP) and provide us with a copy for review and comment. Type-I water supplies are required to have a current water system GP that includes the general layout of the entire waterworks system, including the distribution system, valves, hydrants, storage tanks, wells, and treatment facilities. It is our understanding that the updated RS (Item #3) will include an updated water system GP.

5. Establish a water system capital improvements program (CIP). The CIP should be based upon the recommended improvements that are identified in the updated water system RS. A CIP will also become a required component of the water system GP by January 1, 2016. The city's current water rate structure should also be reviewed to verify whether it can support an on-going water system CIP. The city will also need to proceed with an asset management program by 2016. Asset management provides the basis to establish an adequate rate structure for maintaining an effective O&M program and on-going capital improvements. Enclosed is additional information pertaining to asset management.

6. Adequate file records on the water system seem to be maintained by the Department of Public Works (DPW); however, file records seemed to be located in various locations within the DPW office. DPW staff was able to locate files when requested but it could be better organized. It is up to the city to develop organizational strategies for water system records; however, an organized file system allows for ease of access. Attached is a record retention schedule for community water supplies. Older records can be purged based on the record retention schedule or archived by the city.

7. Establish a more thorough recordkeeping system for hydrants and valves. Existing records appear to be incomplete for most of the older appurtenances. Also, the total number of system isolation valves (excluding auxiliary shut-off valves for hydrants) appears low and should be re-determined. Establishment of a GIS and/or GPS records for these appurtenances is encouraged since it will assist the DWP in maintaining a more organized recordkeeping system. It is our understanding that the city is pursuing funding through the Storm Water Asset Management and Wastewater (SAW) grant program that may provide an opportunity to fund GIS equipment for the city's wastewater infrastructure. We encourage the city to investigate this further for potential use with water distribution system appurtenances.

8. Replace or repair the chemical feed piping connections and/or change-out the chemical feed pumps to control leakage of liquid chlorine at the piping connections. Measures to reduce leakage need to be taken in order to minimize the potential for corrosion in the chemical feed room.

Linden's population has increased from 2801 (2000 census) to 3991 (2010 census). Based upon the number of new residential meters installed since 2010, Linden's current population is estimated to be slightly over 4,000; thus, the city has been re-classified as an S-2, D-2 system. The city shall remain in compliance with the operator certification requirement since the D-2 and S-2 certification is held by one of your operators; however, the designated Operator-in-Charge must have the required level of certification. As we discussed, it would be worthwhile for you and other DPW operators to work towards acquiring the S-2 and D-2 certification. Additional information concerning operator certification, training material, and exam applications can be found on the DEQ website..

Please submit a letter by May 31, 2014, that outlines the city of Linden's plans and schedule to address the above items.

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:jr
Enclosure

cc: Mr. Paul Zelenak, City Manager, City of Linden

WSSN: 03890

Office of Drinking Water and Municipal Assistance

Lansing District Office

Water System Sanitary Survey

City of Linden Water System

Mar-14

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Linden
County: Genesee
Evaluator: MFP

WSSN: 03890
District: 11
Date: 3/13/2014

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source					X		
Construction & Maintenance	*Prev. maint. recc. For Wells #1,3, and 4*				X		
Standby Power				X			
Isolation				X			
Source Water Protection				X			
Capacity				X			
Treatment					X		
Disinfection	*Repair or replace chem feed piping and pumps*				X		
Fluoride				X			
Phosphate Addition		X					
Softening		X					
Iron/Manganese Removal		X					
Arsenic Removal				X			
Pretreatment		X					
Filtration (gravity or membranes)		X					
C*T		X					
Other		X					
Distribution System						X	
Interconnections w/ Other WS		X					
Hydrants & Valves	*Establish a complete recordkeeping system*				X		
Service Lines & Metering				X			
General Plan	*Update 2006 plan in conjunction with updated RS*				X		
Cross Connections	*Outdated CCCP and local ordinance*					X	
Construction & Maintenance				X			
Capacity				X			
Finished Water Storage					X		
Construction & Maintenance	*Re-inspect both ele. Tanks, re-paint 0.15 Mgal tank*				X		
Controls				X			
Capacity				X			
Pumps (All Pumping Facilities)				X			
Construction & Maintenance				X			
Controls				X			
Capacity				X			
Monitoring & Reporting				X			
Bacteriological Monitoring				X			
Chemical Monitoring				X			
MOR or Annual Pumpage Report				X			
Consumer Confidence Report				X			
Analytical Capabilities				X			
System Management & Operations					X		
Owner Responsibility	*Review water system records organization strategies*				X		
Capacity Development				X			
Reliability Study	*Finish updating RS and provide a copy to the MDEQ*				X		
Operations Oversight				X			
Permits				X			
Operator Compliance					X		
Operator Certification	*Re-classified to S2/D2, promote level 2 operator cert.*				X		
Technical Knowledge & Training				X			
Security				X			
Emergency Response Plan				X			
Site Security (Fences, Alarms, ..)				X			
Financial					X		
Rates				X			
Budget & Capital Imp. Plan	*Prepare CIP based on RS to meet the 2016 requ*				X		
Other		X					

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

CITY OF DAVISON
2012 WATER SYSTEM REVIEW

WSSN	3890	Supply	City of Linden	County	Genesee
Date	3/13/2014	Reviewed by	MFP	District	11

Primary Contact:	Scott Fairbanks	Copy To:	Paul Zelenak
Title	DPW Supervisor	Title	City Manager
Telephone	(810) 735-7980	Telephone	(810) 735-7980
Cell Phone	(810) 569-0445		
email	dpw@lindenmi.us		
Address:	132 East Broad Street	Address:	Same
	POB 507, Linden, MI 48451-0507		

WTP Phone #:

Population 4004 Year 2013 Basis MDEQ Est

Distribution Classification: S-2

Operator in Charge	Scott Fairbanks	Cert. S-3
Other Operators	Kevin Tyler	S-2
	Gary Gunsell	S-4
	Jason Payne	S-4

Treatment Capacity 1.96 MGD

Treatment Classification: D-2

Operator in Charge	Scott Fairbanks	Cert. D-3
	Kevin Tyler	D-2
	Jason Payne	D-4
	Gary Gunsell	none

The city of Linden is a groundwater supply utilizing four wells, arsenic/iron removal treatment, elevated storage, and chlorine & fluoride addition. Water is transported into a distribution system consisting primarily of 6, 8, and 12-inch watermains. Arsenic treatment was provided in 2008. Additional well capacity was also provided and Well #5 was rehabilitated in 2013.

The operators listed above make up the city's public works department and are responsible for water, sewer, streets, cemeteries, building inspections, etc. Linden's 2010 population increased to nearly 4,000 and, based upon the number of new service connections since 2010, Linden's estimated population is slightly above 4,000. Linden will be re-classified as an S-2/D-2 system.

WELL INFORMATION

Well Number	1	2	3	4	5
Well Status	op	st-by	op	op	op
P.O.E. ID #					
Treatment	at WTP	Cl2, PO4	at WTP	at WTP	at WTP
Year Installed	1948	1962	1987	2003	2005
Grouted?	Yes	Yes	Yes	Yes	Yes
Rock or Drift	Rock	Rock	Rock	Rock	Rock
Total Depth (ft.)	200'	175'	180'	320'	250'
Casing Depth (ft.)				91,	97'
Casing Diameter (in.)	10"	10"	10"	6"	8" liner screen
Gravel Pack Dimensions					
Gravel Pack Material					
Screen Length (ft.)					
Screen Diameter (in.)					
Screen Slot Size					
Pump Setting		110 ft	80 ft	60 ft	
Static Water Level (ft.)			5 ft	26 ft	16.6'
Pumping Water Level (24hr)			22 ft	84 ft	75 ft
Pumping Water Level (100 day)					
Pump Type	V.T.	V.T.	V.T.	SUB	SUB
Permit Capacity					
Permit TDH					250 FT
Current Capacity	420 gpm	175 gpm	450 gpm	325 gpm	630 gpm
Basis	Peerless test	Peerless test	Peerless test	Peerless test	Peerless test
Current TDH	121 ft		155 ft	191 ft	153 ft
HP	25	15	30	25	60
Last Pulled for Inspection	2009	1989	2004	2003	2013
Last Efficiency Test	2013	1989	2013	2013	2013
Well Seal	Yes	Yes	Yes	Yes	Yes
Casing 12" Above Grade	Yes	Yes	Yes	Yes	Yes
Pump to Waste Piping	Yes	Yes	yes	yes	Via Hydrant
-Screened or Capped?	screened	no	capped	capped	Capped
Air/Vac Relief	Yes	Yes	Yes	NA	NA
-Screened?	Yes	No	Yes	NA	NA
Casing Vent	Yes	Yes	Yes	Yes	Yes
-Screened?	Yes	Yes	see comment	Yes	Yes
Check Valve	Yes	Yes	Yes	Yes	Yes
Meter	Yes	Yes	Yes	Yes	at WTP
Raw Tap	Yes	Yes	Yes	Yes	WTP
Chem Tap	Yes	Yes	Yes	Yes	WTP
Plant Tap	At WTP	At WTP	At WTP	At WTP	At WTP
Chem Feed Outlet	Yes	Yes	Yes	Yes	WTP
Heater	Gas	Ele.	Ele.	Gas	WTP
Water Level Device	Yes	Yes	needs repl	Yes	No
Pressure gauge	Yes	Yes	needs repl	Yes	Yes
Floor Drain	Yes	Yes	Yes	Yes	WTP
Doors open out	Yes	In	Yes	Yes	NA
Alternating Relay	Yes	No	Yes	Yes	Yes
Hands On/Off/Auto	Yes	Yes	Yes	Yes	Yes
Operating Pressure					
Pressure Relief Valve	NA	NA	NA	NA	NA

WELL INFORMATION

AUXILIARY POWER — Available at WTP and Wells #3 and #5

Unit Number of Brand	Perm. Nat. gas
Fuel Type	Nat. gas
Capacity	156 KVA
Starting Frequency	auto start - bi weekly
Load Testing Frequency	sev. times/yr

Comments:
A 50 KW portable generator is also available for Wells #1 and #4; however, there are no provisions (quick connect, transfer switch, etc.) at these wellhouses.

ISOLATION

Well Number	1	3	4	5
Approved Isolation Radius	100'	100'	100'	100'
Available Isolation Radius	150 ft	100 ft	200 ft	80 ft
Type of Isolation Control	Municipal Ownership of all five wells.			
Approved WHP Plan	yes	yes	yes	yes
GW flows from				
Basis				
Important Potential Source				
Distance and Direction				
Important major Source				
Distance and Direction				
Detects				

Comments:
Wells #1, #3 and #5 are the main operating wells during the summer. Well #1 is operated less frequently due to higher iron. Wells #1, #3, and #4 are operated during the winter months.

Wells #4 and #5 are the newest wells with Well #5 being piped directly to the WTP. Most of Well 5's appurtenances are located inside the WTP

Piping improvements were completed at Well #1 in 2009.

Peerless-Midwest performs yearly pump tests and maintenance on all four operating wells. Well #5 was rehabilitated along with installation of an 8-inch gravel pack in 2013 to address a sand pumping problem. The work included installation of an 8-inch, 0.025" slot high flow screen from 85ft BGS to 250 ft. A screen blank was installed between 85 ft and 105 ft to bridge the zone near 95 ft that was contributing the sand. Gravel pack was installed between the original 12-inch casing and the new screen from 90 ft to the bottom of the well.

WTP staff have conducted sand collection tests when Well #5 is in operation and the results are within AWWA recommended standards.

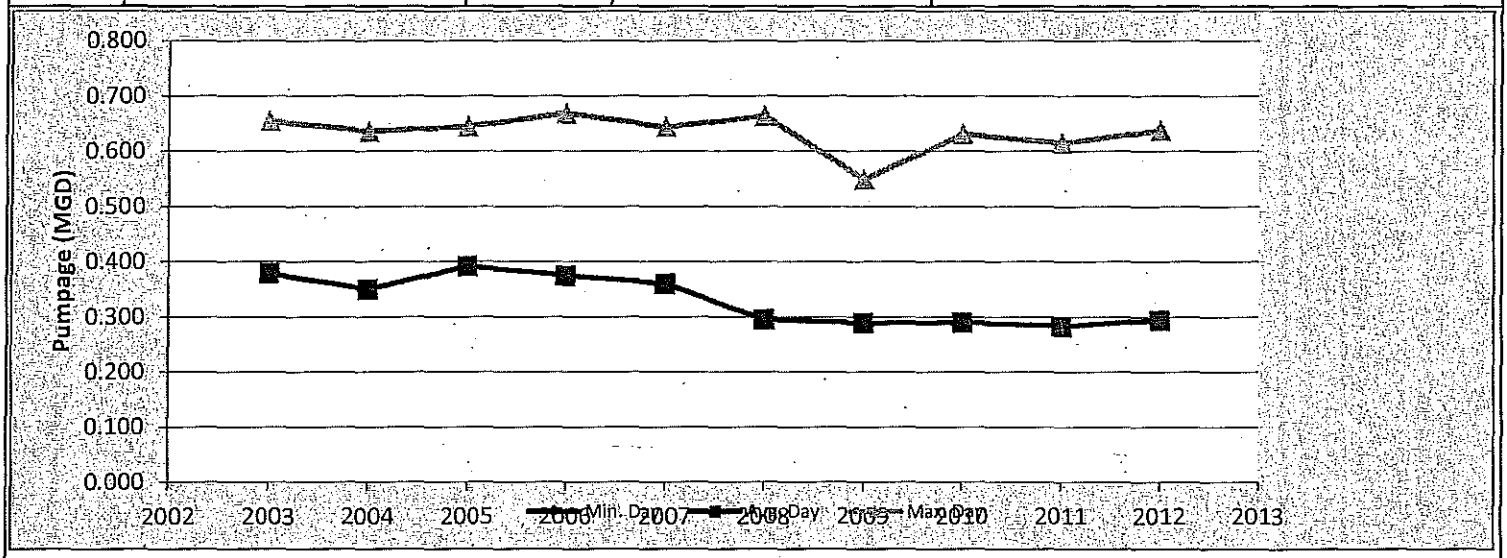
Peerless-Midwest performs annual well pump and performance testing/maintenance. Their 2013 testing concludes the following:

Well #3 is in need of pump/motor maintenance,.
Well #1 is in need of chemical cleaning to alleviate high iron content.
Well #4 is in need of chemical cleaning and pump replacement

SOURCE

Capacity

Year	Pumpage (MGD) Max. Day	Date	Avg. Day	Min. Day	Date	Max/Avg	Population History	G/C/D	% unacct. H_2O
2003	0.655		0.379			1.728232	3416	110.9	
2004	0.636		0.350			1.817143	3659	95.7	
2005	0.645		0.392			1.645408	3872	101.2	
2006	0.669		0.375			1.784	3944	95.1	
2007	0.644		0.360			1.788889	3974	90.6	
2008	0.664		0.295			2.250847	3990	73.9	
2009	0.549		0.289			1.899654	3991	72.4	
2010	0.631		0.290			2.175862	3991	72.7	
2011	0.615		0.283			2.173145	3994	70.9	
2012	0.638		0.294			2.170068	3997	73.6	



Five Year Max. Day	0.664		
Ten year Max. Day	0.669		
Five Year Avg. Day	0.290		
Peak Hour (Hydropneumatic)			
Max Day for capacity requirements	see comment		
Baseline Capacity	1050 gpm	1.513 mgd	
Total Well Capacity	1745 gpm	2.514 mgd	
Firm Well Capacity	1115 gpm	1.607 mgd	
Firm Well Capacity/Max. Day	257%		
Peak Hour/Firm Capacity		(Hydropneumatic w/o gravity storage)	
Total Aux. Power Well Capacity	1080 gpm	1.556 mgd	
Aux. Power Well Capacity/Avg. Day	536%		

Comments:

The five-year average day demand has decreased to slightly under 0.30 MGD and has remained rather steady since 2008. Rehabilitation of Well #5 in 2013 resulted in a modest decrease in its capacity; however, the city maintains adequate firm well capacity. The population estimates between 2003 and 2010 are based upon an extrapolation between the 2000 census (2801) and the 2010 census (3,991) along with number of new residential meters installed (See System Growth - Page 9) Several additional housing starts since 2010 has increased the city's estimated population to slightly over 4,000.

PRODUCTION AND STORAGE REQUIREMENTS

STORAGE CAPACITY

	Location: East Broad St.	Location: South Bridge St.
Volume	50,000 Gal	150,000 Gal
Type		
O.F. Elevation		
Date Constructed	1949	1975
Date Inspected	2008	2008
Date Painted Inside	1998	1996
Paint System	3 coat epoxy	3 coat epoxy
Date painted Outside	1998	1999
Cathodic Protection	No	Yes
High Alarm	Yes	Yes
Low Alarm	Yes	Yes
Type	SCADA	SCADA

Total Usable Storage	200,000	gal
Total Usable Storage/Max Day	30	%
Total Usable Storage/Avg. Day	69	%

Comments:
Both tanks are monitored by a SCADA control system located at the treatment plant. The SCADA system also monitors pump and alarm status, temperature, etc.

Both tanks were inspected in 2008. The 0.150 Mgal tank needed replacement of the wet interior and exterior paint system; however, the work has not proceeded. The roof vent was replaced in 2001.

Both tanks are due for another inspection and bid specifications are being prepared. Replacement of the paint system on the 0.150 Mgal tank is needed and is also being included in the bid. Bids for the work are expected to be advertised in May of 2014.

Interconnections with Other Supplies

Is water purchased from other supplies? No

Distribution Piping

Identify distribution piping materials - estimate percentages:

Cast Iron	<10%	%
Ductile Iron	>90%	%
PVC	<1%	%
A/C	<1%	

Estimated percent of piping with coal tar lining 0 %

Identify distribution pipe sizes - estimate percentages:

2"	0	%
4"	<1%	%
6"	10	%
8"	35	%
10"	0	%
12"	55	%

Are there areas where water main breaks are frequent? no

Comments:
Very few main breaks occurred since 2008 as most of the CI and AC mains were replaced as part of the Ten Streets Project. A section of 6-inch CI main in S. Bridge Street, having occasional breaks is to be replaced in conjunction with a future road project.

Are there areas where customers complain of low pressure? No

Are there areas where aesthetic water quality complaints are frequent? No

Are there areas where fire flows cannot be maintained? No

Last ISO report: 11/8/201 Rating? Class 5

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading, or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

Location: Estimated Completion Date

The city is currently updating their most recent water system reliability study (RS). The updated RS will likely provide a list of recommended water system improvements that can be incorporated into an updated water system capital improvements program (CIP). Also, the city will need to have a water system CIP in place by January 2016.

DISTRIBUTION APPURTENANCES

HYDRANTS

Number of Hydrants	240
Number Without Auxiliary Shut-Off Valves	0%
Number that are Self-Draining	40
Number of Inoperable Hydrants	repaired upon discovery
Frequency of Hydrant inspection:	Spring/Fall

Inspection Staff: DPW
Comments:

Are there areas where additional hydrants are needed?	No		
Hydrant location system	General Plan	Accurate?	ok
Are hydrants color coded for capacity?	Yes		
Has this information been provided to the fire department?	Yes		
Frequency and seasons of hydrant flushing	2/yr - spring & fall		
Purpose of flushing	Dist. syst O&M		
Is the public notified prior to flushing?	Yes		
Does flushing follow a specific format?	Yes		
Is the volume of water used during flushing estimated?	Yes		
Is a record maintained of hydrant activities?	Started		

Comments:
A recordkeeping system has been established for hydrant (numbering system with individual cards). More work; however, is needed to complete hydrant recordkeeping system.

VALVES

Number of Valves	65		
Number of inoperable valves	repaired upon discovery		
Are there areas where additional valves are needed?	needs to determine		
Valve location system	General plan	Accurate?	No
Valve Turning Frequencies	main line - 1/yr; however, no formal prog.		
Records Maintained?	limited to newer valves		

The number of valves listed above appears low and needs to be re-determined. Accurate valve records needs need to be established for all isolation valves as part of improving the city's valve program.

Improvement in the hydrant and valve program (records) are needed. More accurate hydrant and valve information is needed and the information needs to be maintained in a more organized manner. Establishment of GIS and/or GPS records for these appurtenances is encouraged. The city is pursuing funding through the Storm Water Asset Management and Wastewater (SAW) grant program. This program may provide an opportunity to fund GIS equipment for the city's wastewater infrastructure; however, the city is encouraged to investigate this further for potential use with water distribution system appurtenances.

CUSTOMER AND SERVICE INFORMATION

Number of service connections	1230
Number of metered service connections	1230

Identify service line materials and estimate percentages:

Cu	98%
Gal	<1%
PVC	<1%
Pb	2 accts

PUMPAGE DISTRIBUTION

% Residential	96%
% Commercial	3%
% Industrial	<1%
% Large Users - List	Linden Schools
	WWTP
	Carwash
	Cartel Nursing

Ownership of Service	(CWS/Customer)
From Corp Stop to Curb Stop	City
From Curb Stop to Property Line	Prop owner
From Property Line to Meter	Prop owner
Meter	City

Customer Meters

Types of meters Used	T-10 Slumberg remotes, Neptune
Number of Meters with Touch Pads or Other Remote Reading Devices	see comments
Size of Meters	5/8" to 6"
Residential	5/8" to 3/4"
Industrial/Commercial	1" to 6"
Meter Testing/Maintenance Program	replaced as needed, commerc. Tested
Average Age of Meter is System	to be det.
Residential/Commercial/Industrial	to be det.
Criteria for Changeout	as part of replacement program
Number or Percent Changeout per Year	50/yr
Master Meter Locations	none
Calibration of Master Meters	NA
Meter Reading Staff/Contract:	City DPW

Comments

The city is upgrading their meter read system to radio read technology and the upgrade is approximately 25% complete. All commercial businesses are on radio read and change-out is progressing on a street by street basis. The city intends to complete the upgrade within the next several years.

System Growth

Year	No. of Residential Meters Installed	No. of Comm./Industrial Meters Installed	No. of Construction Permits Issued	Permitted Amount of WM Feet
2000	50		1	
2001	74		3	
2002	81		3	
2003	81		1	Well
2004	71		0	
2005	24		3	2,749
2006	10		3	12,916
2007	6		0	0
2008	few		0	0
2009	few		0	0
2010	few		0	0
2011			0	0
2012			0	0
2013	4		1	well rehab

Water Rates

What is your current rate schedule?	$3.55/100 Cu. Ft.
Are current rates adequate to support O&M and CIPS?	CIP - marginal, O&M - yes
When was last time rates were adjusted?	to de det
Has a water rate study been performed? When?	2008
Is there a meter charge or ready to serve charge?	yes
Is a copy of the water rate schedule and ordinance available?	See WSR attachment

The city charges $5.33 per 100 Cu. Feet for service outside the city.

PROGRAMS AND PLANS

CROSS CONNECTION PROGRAM

Ordinance No. Ord. revised - copy to be provided

Approved Program? Yes Date: 1/24/1979

Staff Assigned to Program DPW

Is Annual Cross Connection report required? Yes

Was previous year's annual report received? No Date

Was previous year's annual report acceptable? see comments

Inspection Status: Active Program

Device Testing Frequency RPZs are inspected and tested 1/Yr

Recordkeeping Adequate

Comments:
The city needs to update their cross connection ordinance and program to include more commercial accounts than what is depicted in the annual cross connection reports. Cross connection recordkeeping also needs to be better organized. Based upon our inspection and the annual reports, all high priority accounts are inspected on a yearly basis.

ANNUAL PUMPAGE REPORTS

Is Annual Pumpage Report required? yes

Was previous year's annual report received? yes Date 4/3/2013

MONTHLY OPERATION REPORTS

Are Monthly Operation Reports required? Yes

Were all previous year's reports received? Yes Timely? Yes

Are previous year's reports acceptable? Yes

CONSUMER CONFIDENCE REPORTS

Is the annual CCR requires? (Y/N) Yes

Was the previous year's report received? (Y/N) Yes Timely? Yes

Was the previous year's acceptable? (Y/N) Yes

Was the previous year's certification form received? (Y/N) Yes Timely? Yes

PROGRAMS AND PLANS

Emergency Response Plan

Date of Most Recent Plan: 7/18/2013 Acceptable? Yes

Filed where? MDEQ & City

GENERAL PLAN

Date of Most Recent Plan: 2006 Acceptable? needs updating

Filed Where? MDEQ/DPW/City Hall

Comments:
The 2006 general plan is being updated in conjunction with the RS.

RELIABILITY STUDY

Date of Most Recent Study: 1999

Filed Where? MDEQ, City Acceptable? needs updating

Comments:
The city has retained HRC to update the water system RS. The DPW is assisting HRC in compiling pertinent information for completing the updated study.

MONITORING

Bacteriological

Date of Approved Site Sampling Plan	June 2011		
Number of samples required each month	4	Basis:	population
Certified Lab Used:	MDEQ		
MCL, Monitoring or Reporting Violation(s) in past 3 years? (Y/N)	none	Date:	
Number & Type of Violations	NA		
Public Notice Issued according to regulations? (Y/N)	NA	Date:	

Comments:
The city plans to modify the 2011 sampling plan by changing a repeat sampling location.

Chemical

Date of Monitoring Schedule	2/14/2013		
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)	yes		
If nitrate detect, what is concentration?	ND	Date:	
If nitrite detect, what is concentration?	ND	Date:	
Detects for metals > 50% of MCL? (Y/N)	Yes		
Metals (list)	Arsenic at each wel	Date:	
		Date:	
Detects for VOCs (Y/N)	no	Date:	
Detects for SOCs (Y/N)	no	Date:	
Date of Approved Disinfection Byproduct Monitoring Plan	12/18/2013		

Comments:

Lead and Copper Monitoring

No. of Samples Required:	10		
Frequency (Semi Annual/Annual/Triennial)	Triennial		
Exceedance of lead or copper action level (Y/N)	no		
If yes, was public education issued? (Y/N)	NA	Date:	
Next Monitoring Period:	2015		
Corrosion Control Program Status, if applicable	NA		
Lead service line replacement status, if applicable	NA		

Comments:

Radiological Monitoring

Date of Monitoring Schedule	2/14/2013		
Alpha, beta, radium, uranium	yes	Date:	4/21/2009
Radon	no	Date:	
Tritium	no	Date:	
Detects for Rads > 50% of MCL? (Y/N)			
If yes, list		Date:	

Comments:
Each well was sampled for combined radium (Ra 226 and Ra 228) in 2009. The combined radium levels were less than half the 5 pCi/l standard.

WATER TREATMENT PLANT - (arsenic & iron removal)

IRON & ARSENIC REMOVAL Step:

Year Initiated	2006
Oxidation Method	CL2
Chem feed pump rating:	4.0 gph @ 100 psi
Rated Capacity	1.96 MGD @ 3.0 gpm/sqft (4 filters in service)
	1.47 MGD @ 3.0 gpm/sqft (3 filters in service)

The treatment plant has four adsorption (G-2) media pressure filters. Each filter is 12 feet in diameter and has a capacity of 0.49 MGD.

ANSI/NSF Standard 60 Approved chemicals: Yes - El Chlor

Normal Dosage:	4.38 mg/l
Feed Points:	raw water, post filtration (not adding post CL2)

No detention tank provided since this is a pressure filter application

Filter Type:	Vertical Pressure - single cell
Number of filters	4
Filter Size:	12 ft diameter -452 cu.ft media per filter
Operating Rate:	3 gpm/sq. ft
EBCT:	10 min (4 filters), 7.5 min (3 filters)
Media Depth/Char.	48-inches of G-2 media

Filter Backwash Requirements

Backwash Rate:	566 gpm @ 5 gpm/sqft per filter
Duration:	20 minutes per filter
Rinse:	10 minutes at normal rate
Controls:	pneumatic controlled valves

Backwash Residuals Management:

Backwash Volume:	53,000 gal (13,250 gal per filter)
Backwash Detention:	One 57,275 gallon concrete tank
Disposal:	Shiawassee River - NPDES Permit No. MIG640237
Disposal Pumps:	Two 1.8 HP pumps @ 80 gpm @ 20 ft TDH

Filter backwash is initiated manually and controlled automatically. Backwash water from 2 filters are stored in the backwash detention tank prior to discharge to the Shiawassee River. Iron-arsenic sludge is pumped from the tank bottom approximately four times a year.

Linden is on self retained monitoring for NPDES reporting requirements. Certificate of Coverage (COC) MIG640237 was re-issued on 9/9/2009 and will expire on April 1, 2015. The OIC continues to meet the sampling requirements in the COC.

Filter Regeneration Requirements:

Regeneration will not be utilized, exhausted G-2 media will be replaced instead of being regenerated.

Disinfection

Point of Treatment	WTP	Injection Point:	Raw and treated	
SDWIS Facility ID (Site Code)				
Year Initiated	2008	Purpose:	Disinfection, oxidation	
Product	Sodium hypochlorite	Manufacturer:	El-Chlor	
Chemical Strength	12.50%	Dilution:	fed at 12.5%	
ANSI/NSF Standard 60 Approval? (Y/N)	yes	NSF max dose:		mg/L
Normal Feed Rate/Dosage	4.38 mg/l	mg/L		
Avg Plant Tap Residual (mg/L) total:	1.58 mg/l	free:	0.8 mg/l	
Avg Distribution Residual (mg/L) total:	1.19 mg/l	free:	0.61 mg/l	
Frequency of Residual testing Plant Tap:	daily	Distribution:	daily	
Analytical Method Used	Hach Spectrometer	Instrument:		
Any Overfeed Instances? (Y/N)	no	Date(s):		
Any Low Feed Instances? (Y/N)	no	Date(s):		
Pump Type:	LMI Pos displ	Model:	C921-460HI	
Number of Pumps:	2			
Pump Capacity gpd max:	96	gpd min:		
psi:	100			
Chemical Storage Tank Type	Bulk & day tank	Volume:	500 gal & 50 gal	
Weight/Level Reading Method	digital weigh scale			

SAFETY

Separate Room	yes	Cylinder Repair Kit	NA
Exhaust fan	yes	Extra Chlorinator or repair kit	NA
Fresh Air Vent	yes	Ammonia Bottle	NA
Door Opens Out With Panic Bar	yes	Self Contained Air Packs	no
More than 1500 # Cl_2 onsite	NA	Training Programs	no
Electrical Protected from Gas?	NA	Shower/Eye Wash	yes

Comments:
Chlorine compound leaking around tubing connections. Peristaltic pumps are being considered to alleviate air binding and leakage.

Fluoride Addition

Point of Treatment (Wellhouse Name)	WTP	Injection Point:	Post filtration	
SDWIS Facility ID (Site Code)				
Year Initiated	2008	Purpose:	Improved dental health	
Product	Hydofl. Acid	Manufacturer:	Alexander Chem Corp.	
Chemical Strength	79.8% acid	Dilution:		
ANSI/NSF Standard 60 Approval?	yes	NSF max dose:	4	mg/L
Normal Feed Rate	0.36	mg/L		
DEQ Permitted Feed Rate or Dosage		mg/L		
Avg Plant Tap Residual (total)	0.88	mg/L		
Residual Testing Technique	Spadns Technique - Hach DR 2800 spectrophotometer			
Frequency of Residual testing Plant Tap:	daily	Distribution:	daily	
Any Overfeed Instances? (Y/N)	no	Date(s):		
Any Low Feed Instances? (Y/N)	no	Date(s):		
Pump Type:	Pos. displ.	Model:	LMI	
Pump Capacity gpd max:	38.4 gpd	gpd min:		
psi:	150			
Chemical Storage Tank Type	15 gallon container	Volume:	15 gallon	
Weight/Level Reading Method	Chatillon 900 Lb beam scale			

Comments:
An electronic transformer to the well pump starter breaks out if there is a failure of the well pump motor. A flow meter and a flow switch are also provided on the filter effluent line and both must measure and sense flow in order to energize the fluoride feed pump. The chemical feed room's floor is recessed 4-inches below the WTP's main floor for containment.

3890

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 11, 2011

Mr. Chris Wren, City Manager
City of Linden
132 East Broad Street
P.O. Box 507
Linden, Michigan 48451-0507

WSSN: 3890

Dear Mr. Wren:

SUBJECT: City of Linden – Water System

This letter confirms my visit on March 16, 2011, with Mr. Scott Fairbanks and yourself. The purpose of the visit was to update the City of Linden 2008 Water System Review. The items evaluated include operation and maintenance, monitoring, drinking water standards, reliability, general plan, contingency plan, bacteriological sampling site plan, monthly operation reports, and operator certification. Enclosed is the Linden 2011 Water System Review.

Based on our evaluation, the Linden water supply has received a **"satisfactory"** rating. Water system maintenance, however, needs to proceed in several key areas in order to maintain the integrity of the water system and to protect the city's investment in the water system infrastructure. Operation/maintenance concerns, along with other water related items, are discussed in more detail below.

1. Preventative maintenance is needed for Linden's production wells. Routine pump performance tests performed by Peerless-Midwest (PM) in 2009, revealed the need to overhaul the pump/motor for production Wells #3, 4, and 5. This work would help to address poor pump performance at all three wells and the decrease in capacity, most noted at Well #4.

   It is our understanding that the city is investigating the cost to proceed with the work and that the cost may be included in the city's upcoming operating budget. The city needs to approve this cost and proceed with the work in order to keep the production wells in reliable operating condition.

   Next, this work needs to be completed in order to maintain the rated capacity of these wells. Although the city's production wells provide sufficient capacity to meet average and maximum day demands, a decrease in capacity was noted in PM's report. Thus, the city's investment in source capacity needs to be protected and can only be accomplished by maintaining an active well maintenance program.

Finally, it was noted that the control system is configured such that Well #1 operates in the lead position with Well #3 next in the operating hierarchy during the winter months. This operating role is reversed during the summer months. This type of operating configuration does not allow much utilization of the remaining production wells (Well #4 and Well #5). We recommend that the operating hierarchy be modified such that Wells #4 and #5 are utilized more often. As a minimum, these wells should be pumped to waste on a monthly basis.

2. An inspection of both elevated tanks was performed late in 2008. The inspection report revealed that the 50,000 gallon tank is in good condition and the interior and exterior paint systems have remained intact. A re-inspection, along with possible repainting of the tank's exterior, was recommended in five years.

   The 150,000 gallon tank, however, is in need of preventative maintenance. Specifically, the wet interior paint system was noted to be fair condition and the exterior paint system will be nearing the end of its service life within the next several years. The city needs to budget for repainting of the tank's interior and exterior within the next several years. Finally, the inspection noted a breach in the vent screen could allow insects and birds to gain access to the interior portion of the tank. As we discussed, the vent screen must be repaired or replaced as soon as possible. Repair or replacement of the vent screen needs to be confirmed by no later than April 30, 2011.

3. Linden's population has increased from 2801 (2000 census) to 3991 (2010 census). Although the city's growth rate has decreased over the past several years, the city will soon be serving more than 4,000 people. Your system currently meets the S-3, D-3 operator certification requirement. However, Linden will be re-classified as an S-2, D-2 system when the population served exceeds 4,000. This will require at least one of your operators to obtain the S-2 distribution license and the D-2 limited treatment license. It would be worthwhile to encourage your operators to work towards increasing their level of operator certification. Enclosed is additional information about operator certification, training material, and exam applications.

4. Administrative Rule 1203 of Act 399 of the Michigan Safe Drinking Water Act (MSDWA) requires a public water supply to submit and update a water system reliability study once every 5 years. Our records show that the city of Linden's most recent reliability study was completed in 1999; thus, in accordance with the MSDWA requirements, the 1999 study needs to be updated. The updated study needs to review the city's 5-year and 20-year water use projections and assess the hydraulic capability of the distribution system. Also, a water system capital improvements program (CIP) should be prepared and should be based upon the findings of the study. A list of items that should be included in the reliability study is enclosed with this letter. Finally, we would be available, as needed, to meet with

you and your consultant to discuss the scope of the study in more detail.

5. A recordkeeping system is in place for hydrants and valves; however, further work is needed to complete the recordkeeping system. Records appear to be incomplete for most of the older appurtenances. Also, the total number of system isolation valves (excluding auxiliary shut-off valves for hydrants) appears low and should be re-determined.

   As we discussed, hydrant records should include the following information;

   Hydrant number, type & location, size of barrel, size of bottom valve, size of lead, direction of turn, condition, auxiliary valve type & size, weep hole status, condition of hydrant (caps, chains, valve op., operating nut, leakage, etc.), color coded capacity, flow data (gpm & psi), flushing dates, inspection dates

   Finally valve records should consist of the following information;

   Valve number, exact location (by witness points), type & size of valve, normal operating status (open or closed), condition (operable or in-operable), direction of turn, number of turns, dates of operation, repair history

6. Linden's Cross Connection Control Program (CCCP) and ordinance (Ordinance N. 58), adopted in 1973, need to be updated. The CCCP needs to be updated to reflect the change in the device testing requirement. Specifically, the frequency for testing all testable backflow prevention devices has increased from once every five years to once every three year. Next, the total number of accounts eligible for a routine cross connection inspection appears low. As we discussed, the city will need to identify all industrial, commercial, and institutional accounts as part of re-determining the total number of accounts eligible for an inspection. This information needs to be included in the updated CCCP. Finally, a re-inspection schedule should be prepared and be based upon the degree of hazard that each account represents. Appendix A of the Cross Connection Rules Manual – 4th Edition, contains a suggested model ordinance and Appendix C contains a model CCCP. These examples can be used for updating Linden's CCCP and the cross connection ordinance. Finally, a draft version of the updated ordinance and program should be sent to us for review and comment prior to being adopted.

7. The city has an acceptable water system contingency plan in place; however, changes to the Administrative Rules of the Michigan Safe Drinking Water Act now require an emergency response plan (ERP). The ERP provides an outline to follow in the event of a water related emergency (loss of pressure, contamination, etc.). The ERP is similar to a water system contingency plan; however, the ERP calls for discussion of various types of water utility operational plans that may be utilized during a water related emergency. An ERP template was provided to your Operator-In-Charge (OIC) during the visit and can be used for preparing

Linden's ERP. We will review the completed ERP during our next routine surveillance visit.

8. The issue concerning the privately owned watermains within the Saddlebrook Farms Subdivision has not been resolved. It is our understanding that discussions between the city, the Department of Public Works (DPW), and the owner of the utilities within Saddlebrook Farms, are to proceed soon. As we discussed, the city needs to either assume ownership of the distribution piping or acquire adequate control of its operation and maintenance. Please keep me updated concerning the status of this issue.

9. The United States Environmental Protection Agency (EPA) and the Department of Health and Human Services (HHS) have released new recommendations for fluoride levels in drinking water. The new recommendation suggests a reduction in the optimal fluoride concentration from 0.7 – 1.2 milligrams per liter (mg/l) to 0.7 mg/l. The reduction is based upon exposure to fluoride from other sources such as toothpaste, mouth washes, and other various dental products. As we discussed, you should continue to maintain your current level of fluoridation until the official recommendation is released later this spring. A fact sheet was provided to you and your OIC discussing this issue in more detail.

Finally, it was noted during the review that the DPW is currently upgrading their existing meter system to a radio read system. The change out to radio read is expected to be completed within the next five years. This constitutes a water system improvement and we encourage the city to complete the upgrade as planned.

We look forward to working with you on these and on any other water related matter.

Should you require further information, please contact me at the telephone number below; via e-mail at prysbym@michigan.gov; or Department of Environmental Quality, .O. Box 30242, Lansing, Michigan 48909.

Sincerely,

Michael Prysby

Michael F. Prysby, P.E.
District Engineer
Resource Management Division
Lansing District Office
(517) 335-6122

cc: Mr. Scott Fairbanks, City of Linden

City of Linden
2011 Water System Review

WSSN 3890 Supply City of Linden County Genesee

Date 03/16/11 Reviewed by MFP District 11

Primary Contact:	Scott Fairbanks	Copy To:	Chris Wren
Title:	Deputy DPW Dir.	Title:	City Manager
Telephone:	(810) 735-7980	Telephone:	(810) 735-7980
Address:	132 East Broad St P.O. Box 507 Linden, MI 48451-0507 dpw@lindenmi.us	Address:	132 East Broad St P.O. Box 507 Linden, MI 48451-0507

Population: 3,991 Year: 2010 Basis: 2010 Census

		Cert.	ID #
Distribution Classification:	S-3		
Operator in charge:	Scott Fairbanks	S-3	
Other Operators:	Gary Gunsell	s-4	
	Kevin Tyler (assist)	S-3	
	Jason Payne	S-4	
Treatment Capacity:	1.96 MGD		
Treatment Classification:	D-3		
Operator in Charge:	Scott Fairbanks	D-3	
Other Operators:	Gary Gunsell	none	
	Kevin Tyler	D-3	
	Jason Payne	D-4	

Comments:

The City of Linden is a groundwater supply utilizing four wells, arsenic/iron removal, elevated storage, chlorine and fluoride addition. Water is transported into a distribution system consisting primarily of 6, 8, and 12-inch mains. An arsenic treatment plant was constructed and was placed into service early in 2008. Additional well capacity was also provided and has increased the city's firm well capacity.

The operators listed above make up the city's department of public works. In addition to water system activities, they are responsible for sewers, streets, cemeteries, building inspections, etc.

Linden's 2010 population has increased to nearly 4,000. Linden will be classified as an S-2/D-2 system when the population reaches and/or exceeds 4,000. Although system growth has been very limited over the past several years, the operators will need to pursue the higher level of operator certification.

WELL INFORMATION

	1	2	3
Well Number			
+Well Status	op	st-by	op
+Treatment?	As WTP	CL, PO4	As WTP
P.O.E. I.D.#			
+Treatment?			
Year Installed	1948	1962	1987
Grouted?	Yes	Yes	Yes
Rock or Drift	Rock	Rock	Rock
Total Depth	200 Ft	175 Ft	180 Ft
Casing Depth			
Casing Diameter	10 in	10 in	10 in
Gravel Pack Dimensions			
Gravel Pack Material			
Screen Length			
Screen Diameter			
Screen Slot Size			
Pump Setting		110 ft	80 ft
+Static Water Level			5 ft
+Pumping Water Level (24 hr)			22 ft
Pumping Water Level (100 day)			
+Pump Type	V Turb	V Turb	V Turb
Permit Capacity			
Permit TDH			
+Current Capacity	420 GPM	175 GPM	450 GPM
+Basis	est	est	est
Current TDH	121 ft		155 ft
HP	25	15	30
+Last Pulled For Inspection	2009	1989	2004
Last Efficiency Test	2009	1989	2009
Well Seal	Yes	Yes	Yes
Casing 12" Above Grade	Yes	Yes	Yes
Pump to Waste Piping	Yes	Yes	Yes
- Screened or capped?	No	No	Capped
Air/Vac Relief	Yes	Yes	Yes
- Screened?	No	No	No
Casing Vent	Yes	Yes	Yes
- Screened?	Yes	Yes	Yes
Check Valve	Yes	Yes	Yes
Meter	Yes	Yes	Yes
Raw tap	Yes	Yes	Yes
Chem tap	Yes	Yes	Yes
Plant tap	Yes	Yes	Yes
Chem Feed Outlet	Yes	Yes	Yes
Heater	Yes	Yes	Yes
Water level device	Yes	Yes	Yes
Pressure gauge	Yes	Yes	Yes
Floor drain	Yes	Yes	Yes
Doors open out	Yes	In	Yes

WELL INFORMATION Cont.

Well Number	4	5
+Well Status	op	op
+Treatment?	As WTP	As WTP
P.O.E. I.D.#		
+Treatment?	As Rem.	As Rem.
Year Installed	2003	2005
Grouted?	Yes	Yes
Rock or Drift	Rock	Rock
Total Depth	320 Ft	250 Ft
Casing Depth	91 Ft	97 ft
Casing Diameter	6-in	12 in
Gravel Pack Dimensions		
Gravel Pack Material		
Screen Length		
Screen Diameter		
Screen Slot Size		
Pump Setting	60 ft	
+Static Water Level	26 ft	8 ft
+Pumping Water Level (24 hr)	84 ft	75 ft
Pumping Water Level (100 day)		
+Pump Type	Sub	Sub
Permit Capacity	325 gpm	780 gpm
Permit TDH	250 Ft	153 ft
+Current Capacity	245 GPM	750 GPM
+Basis	est	est
Current TDH	191 ft	141 ft
HP	25	60
+Last Pulled For Inspection	2003	2005
Last Efficiency Test	2009	2009
Well Seal	Yes	Yes
Casing 12" Above Grade	Yes	Yes
Pump to Waste Piping	Yes	Hydrant
- Screened or capped?	Capped	Capped
Air/Vac Relief	Na	Na
- Screened?	Na	Na
Casing Vent	Yes	Yes
- Screened?	Yes	Yes
Check Valve	Yes	Yes
Meter	Yes	At WTP
Raw tap	Yes	WTP
Chem tap	Yes	WTP
Plant tap	WTP	WTP
Chem Feed Outlet	Yes	WTP
Heater	Ele	WTP
Water level device	Yes	Yes
Pressure gauge	Yes	Yes
Floor drain	Yes	WTP
Doors open out	Yes	na

Well Comments:

Wells #1 and #3 are the main operating wells. During the summer, Well #3 is operated in the lead position followed by Well #1. The operating role is reversed in the winter months. Wells #4 and #5 are placed in the lowest operating hierarchy.

Wells #4 and #5 are the newest wells. Well #5 is piped directly to the WTP and much of its appurtenances are located within the WTP.

Routine pump & motor maintenance was performed on Well #1 in 2009. Piping changes were also completed at Wellhouse #1. The packing gland leakage appears excessive around the pump base of Well #1.

Peerless performed a well efficiency test on Wells #3,4, and 5 in 2009. Below are the recommendations for each well:

Well #3 - Pump performance and specific capacity have decreased. Recommend to pull pump/motor for maintenance and check for possible plugging in pump or column pipe.

Well #4 - Static water level has dropped and the pump performance is poor. Recommend to pull pump/motor as soon as possible and perform a chemical cleaning of the well.

Well #5 - Pump performance has decreased significantly. Recommend to pull pump/motor for routine maintenance soon as possible.

Well #2 remains a stand-by well and the well is physically disconnected from the distribution system.

WELL INFORMATION CONTINUED

WELL AUXILIARY POWER:

Well Number	3/5 & WTP
+Power Type	Permanent Nat. Gas
+Fuel Type	Natural Gas
Capacity	156 KVA
Starting Frequency	auto start bi- weekly
Load Testing Frequency	several times/year

PORTABLE AUXILIARY POWER:

A 50 KW portable generator is also available for Wells #1 and #4; however, there are no provisions (quick connect, transfer switch, etc.) at these wellhouses.

ISOLATION:

Well Number	1	3	4	5
Approved Standard Isolation Radius	100 Ft	100 ft	100 ft	100 ft
Available Isolation Radius	150 ft	100 ft	200 ft	80 ft
Type of Isolation Control	municipal ownership			
Approved WHP Plan?	Yes			
GW flows from				
+Basis				
Important Potential Source				
Dist. and Dir. from Well				

Important Major Source Dist. and Dir. from Well Detects				

Comments:

Well #5 has approximately 80 feet of isolation from the Shiawassee Shores property. A land-use agreement was established between the city and Shiawassee Shores such that no immediate sources of contamination would be located within 100 feet of Well #5.

The arsenic treatment plant located at the end of Blythe Street near Wells #3 and #5 has been in operation for over three years. The treatment plant continues to meet its treatment objective - reduction of arsenic in the treated water to less than 5.0 ppb.

Vulnerability Assessment

Linden's wells were determined to be "moderately" vulnerable to volatile organics, pesticides, and herbicides. Further discussion of this and the associated chemical monitoring guidelines are included in previous correspondence.

PRODUCTION AND STORAGE REQUIREMENTS

Production History Units are in MGD

YEAR	Max Day	Avg Day	Av Day Max Mo	Max/Avg	G/C/D	% UnAcct H20
1997	0.588	0.283	0.363	2.08	118	
1998	0.547	0.278	0.356	1.97	116	
1999	0.646	0.315	0.448	2.05	131	
2000	0.532	0.259	0.326	2.05	92	pop 2801 cen
2001	0.790	0.315	0.551	2.51	103	pop 3053 est
2002	0.676	0.357	0.515	1.89	107	pop 3328 est
2003	0.655	0.379		1.73	105	pop 3603 est
2004	0.636	0.350	0.503	1.82	91	pop 3844 est
2005	0.645	0.392	0.561	1.65	100	pop 3926 est
2006	0.669	0.375		1.78	95	pop 3960 est
2007	0.644	0.360	0.514	1.79	90	pop 3980 est
2008	0.664	0.295	0.426	2.25	74	pop 3984 est
2009	0.549	0.289	0.365	1.90	72	pop 3988 est
2010	0.631	0.290	0.444	2.18	73	pop 3991 cen

Five year Max Day 0.669 MGD Date 2006
Ten year Max Day 0.790 MGD Date 7/01
Five year Avg Day 0.322 MDG

Max Day for capacity requirements 0.669 MGD

Comments:

Well Capacity

Total Well Capacity 1,865 gpm 2.69 mgd

Firm Well Capacity 1,115 * gpm 1.61 * mgd

Max Day/Firm Well Capacity 42 %

Total Auxiliary Power
Well Capacity 1,200 gpm 1.73 mgd

Aux Power Well Capacity/Avg Day 537 %
+Basis of Auxiliary Power Waiver N.A.

Comments:

The average water demand has decreased to approximately 300,000 gpd since 2008. No additional increase in the maximum day demand has occurred and can be attributed to the lack of any significant development since 2008.

Additional well capacity was acquired in 2005; thus, the city has adequate firm well capacity.

The population estimates between 2001 and 2009 are based upon the number of new residential service connections multiplied by 3.4 persons per connection.

PRODUCTION AND STORAGE REQUIREMENTS

Storage Capacity

	Location: E Broad Fac. ID #	Location: S Bridge Fac. ID #	Location: Fac. ID #
Volume	50,000 G	150,000 G	
+Type			
O.F. Elevation			
Date Constructed	1949	1975	
Date Inspected	2008	2008	
Date Painted Inside	1998	1996	
Paint System	epoxy	epoxy	
Date Painted Outside	1998	1999	
Cathodic Protection	No	Yes	
High Alarm	Yes	Yes	
Low Alarm	Yes	Yes	
+Type			

Total Usable Storage 200,000 gal. 0.20 mil. gal.

Total Usable Storage/Max Day 29.0 %

Total Usable Storage/Avg Day 66.6 %

Comments:

Both tanks levels are monitored by the SCADA control system located at the treatment plant. The SCADA system also monitors pump and alarm status, temperature, etc.

Both tanks were inspected in late 2008. The inspection revealed that the 150,000 gallon tank was in need of preventative maintenance. The exterior and wet interior paint systems need to be replaced. Also, the roof vent needs to be replaced. The 50,000 gallon tank was in good condition and a re-inspection was recommended in five years.

The city has placed tank maintenance into the 2011 budget; however, the work may not be completed in 2011. The roof vent; however, needs to be replaced as soon as possible.

DISTRIBUTION

Pumping Stations None

Interconnections With Other Supplies

Is water purchased from other supplies? No

Distribution Piping

Identify distribution piping materials -

PVC	0 %
D.I.	>90 %
C.I.	<10 %
AC	<1 %
Concrete	0 %

Estimated per cent of piping with coal tar linings: 0 %

Identify distribution pipe sizes -

2-in	0 %
4-in	<1 %
6-in	10 %
8-in	35 %
10-in	0 %
12-in	55 %

Are there areas where water main breaks are frequent? No

Comments:

Very few main breaks have occurred since 2008. Much of the remaining AC and cast-iron mains were replaced with ductile iron main several years ago during the Ten-Streets project. One section of 6-inch CI main in S. Bridge St has experienced occasional breaks associated with an existing hydrant. The city is planning to replace this main.

Are there areas where customers complain of low pressure? No

Are there areas where aesthetic water quality complaints are frequent? No

Are there areas where fire flows cannot be maintained? No

Last ISO report date? 11/8/2010 Rating? Class 5

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

Location	Est. Completion Date

Comments:

A new 5-year CIP for replacing utility infrastructure (including watermain) has been prepared. The CIP calls for elimination of additional dead-end mains, main replacement in S. Bridge Street, and elevated tank maintenance (repainting). A copy of the most recent CIP will be provided to us.

Distribution System Appurtenances

Hydrants

Number of hydrants	240
Number without auxiliary shut-off valves	0
Number that are self-draining	40
Number of inoperable hydrants	repaired asap

Frequency of hydrant inspection: Spring and Fall

Inspection staff: DPW

Comments:

Are there areas where additional hydrants are needed? No

Hydrant location system? Map Accurate? Yes
Are hydrants color coded for capacity? Yes

Has this information been provided to the fire department? Yes

Frequency and seasons of hydrant flushing? 2/Yr Spr/Fall

Purpose of flushing? Clean mains, op. valves, check hydrants

Is the public notified prior to flushing? Yes

Does flushing follow a specific format? Yes, very thorough

Is the volume water used during flushing estimated? Yes

Is a record maintained of hydrant activities? Started, remains incomplete

Comments:

A recordkeeping system has been established for hydrants with each hydrant being assigned a number and card. Further work; however, is needed to complete the recordkeeping system.

Hydrant records should include;

hydrant number, location of hydrant, type of hydrant, size of barrel, size of bottom valve, size of lead, direction of turn, operable or inoperable, auxiliary valve type and size, weep holes plugged or unplugged, condition of hydrant(caps, chains, valve operation, operating nut, leakage, etc.), color coded capacity, flow data(gpm & psi), flushing dates, inspection dates.

Valves

Number of valves 65 (excluding hydrant shut-offs)
Number of inoperable valves replaced when found

Are there areas where additional valves are needed? No

Valve location system? Map Accurate? Yes-some

Valve Turning Frequencies: Main-line valves are exercised yearly. Some valves are also exercised during routine flushing; however, an organized program does not appear to be in place.

Records maintained? Valve records are limited to the newer valves.

Comments:

The number of valves listed above appears low and needs to be re-determined. The exact location of newer system valves installed in recent distribution system projects are in place. Accurate valve records are not in place for most of the older system valves.

Customer and Service Information

Number of service connections 1230
Number of metered service connections 1230

Identify service line materials and estimate percentages:

Copper	98 %
PVC	>1 %
Gal	>1 %
Lead	2 acct

Pumpage Distribution

% Residential	96	
% Commercial	3	
% Industrial	0	
% Other	0.5	
% Large Users - List		Linden Schools
		WWTP
		Carwash
		Cartel Nursing

Water Rates

Current water rate schedule: Yes
Last water rates adjustment: March 2010

Water rate study status: Updated study completed in 2008

Meter charge or ready to serve charge: Yes

Water rate schedule and water ordinance available: Yes

Tap-in Fees: $3000 in city, $5000 outside city

Current water rates are as follows: $3.35 per 100 cu. Feet (inside city)
$5.33 per 100 cu. Feet (outside city)

The water rate study was updated in 2008. A copy of the updated study will be provided to us.

PROGRAMS AND PLANS

Cross Connection Program

Ordinance No. 58 Date 03/19/73

Approved Program? Yes Date 03/12/74

Staff assigned to program DPW - Scott Fairbanks

Is Annual Cross Connection Report Required? Yes

Was previous year's annual report received? Yes Date 3/31/10

Was previous year's annual report acceptable? Yes

Inspection Status: Number of annual inspections appears low

Device Testing Frequency: Annually

Recordkeeping: Being re-established

Comments:

The city's cross connection control program and ordinance needs to be updated. Also, the total number of accounts eligible for a routine cross connection inspection appears low. The DPW will need to review and re-determine the total number of commercial, industrial, and institutional accounts as part of updating the program. Although the program needs updating, all high priority accounts were inspected in 2008 and 2009. Also, 15 testable devices were tested in 2008 and 10 were tested in 2009.

Annual Pumpage Reports

Is Annual Pumpage Report Required? Yes

We did not receive a copy of the 2007 report.

Monthly Operation Reports

Are Monthly Operation Reports required? Yes

Were all previous year MOR's received? Yes Timely? Yes

Are previous year's MOR's Acceptable? Yes

Consumer Confidence Report (CCR)

Is the annual CCR required? Yes

Was the previous year's report received? Yes Timely? Yes

Was the previous report acceptable? Yes

Meter Program

Type of water meter used? T-10s Slumberg remotes, Neptune

Number of meters with remote readers or touchpads? Being changed *

Size distribution of water meters? 5/8" - 6-inch

Meter testing & maintenance? Replaced when needed, commercial meters tested

Average meter age in system? *

Criteria for change-out? As part of replacement program

Number of meters changed per month? 50/year as part of change-out program

Percent water loss in the system? Not determined

Master meter locations? none

Meter reading staff? DPW

* The city is in the midst of upgrading to a radio-read system. Commercial and residential meters are being replaced with radio read meters (several blocks per year). The city's goal is to be 100% radio read in 5 years.

System Growth Information

Year	# of Residential Meters Installed	# of Construction Permits Issued
1998	31	2 (1 for tank work)
1999	39	3 (1 for tank work)
2000	50	1
2001	74	3
2002	81	3
2003	81	1 - prod well 4
2004	71	0
2005	24	2 - one for WTP
2006	10	3
2007	6	0
2008	few	0
2009	few	0
2010	few	0

Linden's population expanded by over 1,000 between 2000 and 2005; however, there has been very limited development since 2005.

Emergency Response Plan

Date of most recent plan 4/23/08 Acceptable? ERP needed

Filed where? DPW, City Hall, MDEQ

The water system contingency plan was updated in 2008; however, the contingency plan needs to be replaced with an Emergency Response Plan (ERP). An ERP template was provided to the OIC during the review.

General Plan

Date of most recent plan 2006 Acceptable? Yes

Filed where? MDEQ & DPW

Rowe has prepared a more recent general plan in 2006 and the city has a copy available for use.

Reliability Study

Date of most recent study 1999 Acceptable? Needs to be updated

Filed where? MDEQ & City

Comments:
The 1999 study needs to be updated.

Bacteriological Sample Site Plan

Date of approved plan 12/97

Are samples still being collected in accordance with the plan? Yes

Number of samples required each month: 3
Basis: population
Cert Lab used: MDEQ

MCL, monitoring, reporting violations? None in past 12 months

Number & type of violations in past 12 months

Public Notice issued according to regulations: na

Comments:

Linden's Sampling Site Plan needs to be updated to reflect the new Groundwater Rule.

Chemical Monitoring

Date of monitoring schedule: Feb 2010

Are samples still being collected in accordance with the schedule? Yes

Were nitrate, nitrite, and fluoride(or p-chem) samples collected? Yes
If nitrate detect, what is concentration? Not detected
If nitrite detect, what is concentration? Not detected

Detect for metals >50% of MCL
Metals (list) Raw water arsenic >10ppb, Treated water <5ppb

Detects for VOCs - none
Detects for SOCs - none

Date of approved Disinfection Byproduct Monitoring Plan _____
DBP sampling done? - yes

Lead/Copper Monitoring

No. of samples required:	10
Semi annual/annual/triennial	triennial
Exceedance of lead or copper AL	no
If yes, was public education issued?	Na
Next monitoring period	2012
Corrosion control program	na
PB service line replacement	na

Radiological Monitoring

Date of monitoring schedule: Feb 2010

Are samples still being collected in accordance with schedule?	yes
Alpha, beta, radium, uranium	4/21/09
Radon	
Tritium	

Detects for rads >50% of MCL?
If yes, list
Radium 226 - 1.9 pCi/L
Radium 228 - 0.68 pCi/L

Wellhead Protection

Although a WHHP is not required, wellhead protection should be pursued. The delineation should be performed in conjunction with the aquifer analysis to determine whether additional groundwater capacity is available at the existing wellsites.

Water Treatment Plant

Iron/Arsenic Removal

Year installed: 2006
Rated Capacity: 1.96 MGD - 4 filters in service
Firm Capacity: 1.47 MGD - 3 filters in service

The treatment plant has four adsorption (G-2) media pressure filters. Each filter is 12 feet in diameter has a capacity of 0.49 MGD.

Oxidation Method: CL2

If chemical oxidation, rating of feed pumps: 4.0 gph @ 100 psi

ANSI/NSF Standard 60 Approved Chemicals: Yes - EL Chlor
Maximum allowable dosage:
Normal dosage: 3 - 3.25 ppm
Feed points: raw water, post filtration (not adding post CL2)

Detention tank volume: No detention tank (gal or cuft.)
Detention time at rated capacity: NA minutes

Filter Type: Vertical Pressure - single cell
Filter Specifications
Number of Filters: 4
Filter size: 12 ft dia filters - 452 cuft of media per filter
Operating Rate: 3 gpm/sqft
EBCT: 10 min (4 filters), 7.5 min (3 filters)
Media Depth/Char. 48-inches of G-2 media

Filter Backwash Requirements

Backwash Rate: 566 gpm @ 5 gpm/sqft for each filter
Duration: 20 minutes per filter
Rinse: 10 minutes at normal filtration rate

Backwash Residuals Management:

Backwash volume: 53,000 gal (13,250 gal per filter)
Backwash detention: One 57,275 gallon concrete tank
Disposal: Shiawassee River - NPDES Permit No. MIG640237
Disposal pumps: Two 1.8 HP pumps @80 gpm @ 20ft TDH

Filter backwash is initiated manually and controlled automatically. Backwash water from 2 filters are stored in the backwash detention tank prior to discharge to the Shiawassee River.

Linden is on Retained Self-Monitoring for NPDES reporting requirements. Certificate of Coverage (COC) MIG640237 was re-issued on 9/8/2009 and will expire on April 1, 2015. The OIC has met the sampling requirements in the COC.

Filter Regeneration Requirements:

To be determined
Chemical used - 3 bed volumes of 1% NAOH followed by 3 bed volumes of 1% H2SO4

Cross Connection Protection: Adsorption media regeneration

Cross connection protection is achieved by closing the manual gate valves and the automatically controlled pneumatic valves on both the influent and effluent sides of the treatment unit. Caustic and acid are then applied to the treatment unit through a 2-inch corporation downstream of the pneumatic valve on the influent side. A sample tap located between the manually controlled valve and the pneumatic valve is opened to verify that both valves are seating properly. The make-up water is provided from a fire hose connection that is also protected with an RPZ backflow preventer device. Media regeneration is not anticipated for the next several years.

Disinfection

Points of Entry ID # WTP

Year initiated: 2008

Purpose: oxidation/disinfection

Location of disinfection point: WTP - prior to filters and after filters

Compound & Concentration: 12.5% Sodium hypochlorite - EL Chlor - by Elhorn

ANSI/NSF Standard 60 Approval? Yes

Feed Rate: 3.0 - 3.25 ppm

Chlorine residual meas. tech.: Hach Spectrometer

Avg Plant tap residual (free): 0.4 - 0.5 ppm

Avg Plant tap residual (total): 1.4 - 1.5 ppm

Avg distribution residual (free): 0.4 ppm

Avg distribution residual (total): 1.2 - 1.3 ppm

Pump capacity: 4 gph max @ 100 psi

Type: LMI positive displacement pump, C921-460HI

The chlorine feed system also contains a 500-gallon bulk storage tank located on an 4 ft elevated platform. Chlorine is fed by gravity to a 50-gallon day-tank. The day tank is graduated and the tank is also placed on a digital weigh scale for dosage determination. The WTP is currently not applying chlorine at the post chlorination feed point.

Phosphate Addition: - discontinued

Fluoride Addition

Year installed: 2008

Purpose: Improved dental health

Location of injection point: post filtration

Compound & Concentration: Hydrofl. Acid from Haviland Products Co. - by Elhorn

ANSI/NSF Standard 60 Approval? Yes

ANSI/NSF Maximum Dosage: 4 ppm

Feed Rate/Dosage: 0.4 ppm

Avg Raw Water Fluoride Conc: 0.2 - 0.5 ppm

Avg Plant Tap Residual: 0.8 ppm

Avg Distribution Residual: 0.7 - 0.8 ppm

Pump Capacity: 1.6 GPH @ 150 psi

Pump Type: LMI B911-490F1 positive displacement pump

Weight Scale: Chatillon Scale 1-900 pound range

Redundant feed pump activation controls:

An electric transformer to the well pump starter breaks out if there is a failure with the well pump motor. A flow meter and flow switch are also provided on the filter effluent line and both must measure and sense flow in order to energize the fluoride feed pump.

The hydroflu. acid is supplied in 15 gallon barrels. The acid is fed directly from the barrel and the barrel is placed on a weigh scale for dosage determination.

6050

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

March 26, 2013

Mr. Robert Jennings, DPW Superintendent
Village of Otisville
300 East Street
P.O. Box 6
Otisville, Michigan 48463

WSSN: 05050

Dear Mr. Jennings

SUBJECT: Village of Otisville - Water System Sanitary Survey

This letter will confirm my visit with you on January 30, 2013, and summarize the subsequent review and discussion of the water supply facilities serving the village of Otisville. The purpose of this meeting was to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). In addition, the enclosed Water System Review form was updated to gather information on the village of Otisville water supply system.

Our updated survey visit confirms that the recently installed chlorine analyzer is adjusting the chlorine dosage at the iron removal plant (treated side) with fluctuating iron concentration in the raw water. This provision is helping to prevent chlorine spikes and associated high chlorine complaints near the iron removal plant's point to entry to the distribution system.

Next, Peerless-Midwest recently performed an inspection of the filter media that included core sampling of each filter cell. Based upon our discussion, the filter media was found to be in good condition and a copy the inspection report is pending. Please provide us with a copy of the inspection report.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	Recommendations made
Treatment	No deficiencies/recommendations
Distribution System	**Deficiencies Identified**
Finished Water Storage	Recommendations made

Pumps	Recommendations made
Monitoring & Reporting	No deficiencies/recommendations
Management & Operations	**Deficiencies Identified**
Operator Compliance	No deficiencies/recommendations
Security	No deficiencies/recommendations
Financial	Recommendations made
Other	No deficiencies/recommendations

The following deficiencies are violations of Act 399 and must be resolved in order to return the water system to compliance.

1. The village has not completed a water system reliability study. This is a violation of R 325.11203 (1) of Act 399 and the administrative rules. The village was also requested to proceed with preparing a water system reliability study in our January 20, 2011, and November 1, 2011, correspondence.

   To re-achieve compliance with Rule 1203 of Act 399, the village needs to prepare a water system reliability study by no later than September 30, 2013. In addition to including the items required in a reliability study (copy of reliability study criteria enclosed), the study also needs to take the opportunity to investigate the village's long-term water source/treatment alternatives. As we discussed, the village will be confronted with the challenge of identifying the most practical and cost-effective alternatives that include the following; restoration of Well #1, replacement of Well #1 (same location), replacement of Well #1 (near Well #3), and/or provide ion-exchange softening. As part of the reliability study, each alternative needs to be investigated to determine the best long-term water supply option for the village. As always, we are available to meet with the village and their consultant to discuss the scope of the reliability study in more detail.

2. R 325.11602 (1) requires Type-I public water supplies to have a current water system general plan that includes the general layout of the entire waterworks system, including the distribution system, valves, hydrants, storage tanks, wells, and treatment facilities. The village's most recent water system general plan was prepared in 1989 and is outdated.

   The village needs to update their general plan to re-achieve compliance with Rule 11602 of Act 399. The revised general plan needs to be included with the water system reliability study and be completed by no later than September 30, 2013.

It is hoped that the following recommendations will prove useful in enhancing the operation and maintenance of your water supply.

1. Wells #1 and #3 are due for routine pump and motor maintenance. Both wells should be scheduled for routine maintenance. This work may also result in a slight improvement in the capacity of Well #1.

2. Proceed with installing the proposed sand separator in the wellhouse piping at Well #1 to alleviate the problems associated with sand entering the distribution system. The proposal that was sent to our office last fall was reviewed and approved by our office.

3. The elevated tank's most recent inspection was performed in 2009; thus, another routine inspection should be scheduled within the next one to two years.

4. Establish a more complete hydrant and valve recordkeeping system. A card filing system is recommended for each appurtenance. Please reference Page 9 of the Sanitary Survey for the specific items that should be contained in the card files.

5. Increase the level the Cross Connection Control Program (CCCP) enforcement for CCCP customers that remain in non-compliance with the program. Specifically, the village has encountered some difficulty in achieving compliance with device testing among some customers. The village needs to fully enforce their local cross connection ordinance for customers who are reluctant to have their backflow prevention device(s) tested.

6. Plant tap chlorine residuals need to be monitored on a daily basis for each day of operation and entered into the village's monthly operation report (MOR). Also, the combined water production on a daily basis from Wells #1 and #3 needs to be reported in the MOR. Finally, since phosphate is added at Well #1, the plant tap and distribution system phosphate concentration needs to be monitored several times per week.

7. The Department of Environmental Quality questions whether Otisville's water rate schedule is adequate to allow for water system capital improvements. The village's current water rate structure should be reviewed to verify whether the current rate structure can support water system capital improvements projects. The reliability study will likely provide a list of recommended water system improvements which will need to become part of a capital improvements program. The village will eventually need to proceed with an asset management program as part of maintaining an adequate rate structure to support both an active operation and maintenance program and on-going capital improvements. We will discuss asset management in more detail during future site visits.

8. Repair or replace the existing telemetry control system. The existing system has experienced frequent failures that have resulted in overflow from the elevated tank due to excessive pumpage. These events have also made it difficult to determine the village's actual maximum day water usage.

Please submit a letter by *April 30, 2013,* that outlines the village of Otisville's plans and schedule to address the above items.

If you have any questions, feel free to contact me at (517) 335-6122; prysbym@michigan.gov; or Department of Environmental Quality, Office of Drinking Water and Municipal Assistance, Lansing District Office, 525 West Allegan Street, 4th Floor North, 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

Enclosure
mfp:jr

cc: Ms. Andrea Barder, Clerk, Village of Otisville

WSSN: 05050

Office of Drinking Water and Municipal Assistance

Lansing District Office

Water System Sanitary Survey

Village of Otisville Water System

Feb. 2013

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: Villlage of Otisville
County: Genesee
Evaluator: MFP

WSSN: 05050
District: 11
Date: 1/30/2013

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source					X		
Construction & Maintenance	*Well #1 & # 3 due for routine P&M maintenance*				x		
Standby Power				x			
Isolation				x			
Source Water Protection				x			
Capacity	*Maintenance at Well # needed - slight capacity imp.*				x		
Treatment				X			
Disinfection				x			
Fluoride			x				
Phosphate Addition				x			
Softening			x				
Iron/Manganese Removal				x			
Arsenic Removal			x				
Pretreatment			x				
Filtration (gravity or membranes)			x				
C*T			x				
Other			x				
Distribution System						X	
Interconnections w/ Other WS			x				
Hydrants & Valves	*More detailed hyd/valve records rec.*				x		
Service Lines & Metering				x			
General Plan	*Existing 1989 general plan is outdated*					x	
Cross Connections	*Enf. of CCCP ord. needed for custs. in non-compl.*				x		
Construction & Maintenance				x			
Capacity				x			
Finished Water Storage					X		
Construction & Maintenance	*Inspect elevated tank in next 1 to 2 years*				x		
Controls	*Telemetry system failures - repair or replace syst.*				x		
Capacity				x			
Pumps (All Pumping Facilities)				x			
Construction & Maintenance				x			
Controls				x			
Capacity				x			
Monitoring & Reporting					X		
Bacteriological Monitoring				x			
Chemical Monitoring				x			
MOR or Annual Pumpage Report	*Chlorine residuals and max day usage needed*				x		
Consumer Confidence Report				x			
Analytical Capabilities				x			
System Management & Operations						X	
Owner Responsibility				x			
Capacity Development			x				
Reliability Study	*Reliability study needs to be performed.*					x	
Operations Oversight				x			
Permits				x			
Operator Compliance				X			
Operator Certification				x			
Technical Knowledge & Training				x			
Security				X			
Emergency Response Plan				x			
Site Security (Fences, Alarms...)				x			
Financial					X		
Rates	*Village needs to pursue asset management*				x		
Budget & Capital Imp. Plan	*Current rate structure may not support CIPs.*				x		
Other							

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

WATER SYSTEM SANITARY SURVEY

GENERAL

Basic Information

WSSN:	05050	Supply:	Village of Otisville	County:	Genesee
Date:	1/30/2013	Reviewed by:	MFP	District:	11

Primary Contact:	Bob Jennings	Copy To:	Andrea Barder
SDWIS Role:		SDWIS Role:	
Title:	OIC	Title:	Village Clerk
Telephone:	(810) 631-4680	Telephone:	(810) 631-4680
Cell Phone:	(810) 397-9375	Cell Phone:	
Pager:		Pager:	
Fax:		Fax:	
e-mail:	rrjennings6@aol.com	e-mail:	
Address:	300 East Street, P.O. Box 6	Address:	same
	Otisville, MI. 48463		

Population:	864	Year:	2010	Basis:	2010 Census

Operator Certification

Distribution Classification:	S-4	Certification	Op. #	Exp. Date
Operator in Charge:	Dan Campbell	S-3		
Backup Operator:				
Other Operators:	Bob Jennings	None		

Treatment Capacity:	0.93 MGD			
Treatment Classification:	D-4	Certification	Op. #	Exp. Date
Operator in Charge:	Dan Campbell	D-3		
Backup Operator:				
Other Operators:	Bob Jennings	None		

Do the operators receive adequate technical training? Yes

If not, what and why?

Comments:

Ownership

Ownership:	Village
Consent Agreement:	
Escrow Account:	
Annual Fee:	Paid

Comments:

Otisville is a small rural groundwater supply that utilizes two wells as their main source and a third well for stand-by. The stand-by well is limited in capacity and produces water that exceeds the arsenic MCL. Well #1 and Well #3 are used for routine operation. Iron removal treatment is provided at Well #3. Well #1 has chlorination and phosphate feed. Water is piped into a small distribution system. A 50,000 gallon elevated storage tank is also provided.

SOURCE

Well Construction and Maintenance				
BASIC DATA				
Well Name/Number	Well #1	Well #2	Well #3	
Wellogic ID				
SDWIS Facility ID (Site Code)				
Well Log Available?			yes	
Constructed Date			1998	
Well Status	op.	st-by	op	
Well Status Date				
Treatment at Well	CL2, PO4	CL2, PO4	Fe Rem	
SDWIS Entry Point ID (Site Code)				
Treatment at Entry Point	yes	yes	yes	
GPS Coordinates Latitude				
Longitude				
Operator Visit Frequency	1/day	as needed	1/day	
WELL CONSTRUCTION				
Grout Type				
Rock or Drift	Rock	Rock	Drift	
Casing 12" Above Grade	yes	yes	yes	
Total Depth	415 Ft	350 ft	177 ft	
Casing Depth			147 ft	
Casing Diameter	10-in	10-in	12-in	
Gravel Pack Dimensions			12X18 in	
Gravel Pack Material				
Screen Length			30 ft	
Screen Diameter			12-in	
Screen Slot Size				
Comments:				
WELL PUMP INFORMATION				
Pump Type	Sub	Sub	V. Turb	
HP	15	20		
Permit Capacity (GPM)			400	
Permit TDH			425 Ft	
Current Capacity (GPM)	125	80	400 (VFD down)	
Current TDH				
Basis for Current Capacity				
Pump Setting	200 ft	230 ft	147 ft	
Static Water Level	45 ft		6 ft	
Pumping Water Level (24 hr)			26 ft	
Pumping Water Level (100 day)			30 ft	
Last Cleaning				
Last Pulled for Inspection	2005	1994	1999	
Last Efficiency Test	2005	1994	1999	
Phase/Surge/Lightning Protection				

Comments:

Well # 1 pump & motor replaced with submersible in 2005. The Aqua-Stream Suction Flow Control device installed around the well casing is no longer intact and was removed. Well #1 continues to have problems with pumping sand and its capacity has decreased to approx. 125 gpm. The village is planning to install a sand separator. This well is due for routine pump/motor maintenance. Portion of borehole between terminus of outer casing and screen does not appear to be grouted based on Layne's well log schematic.

Wells 1 & 3 alternate in operation. Although iron removal treatment is provided at Well #3, the water is high in hardness; thus, the village alternates use of both wells. Well #3 is due for routine pump/motor maintenance.

SOURCE

Well Construction and Maintenance

Well Number	Well #1	Well #2	Well #3	-
WELL APPURTENANCES				
Well Seal	yes	yes	yes	
Pump to Waste Piping	yes	yes	yes	
Screened?	capped	no	capped	
Air/Vac Relief	NA	NA	yes	
Screened?	NA	NA	yes	
Casing Vent	yes	yes	yes	
Screened?	yes	yes	yes	
Check Valve (VT or Sub)	yes	yes	yes	
Meter	Spaulding -Turb	yes	Turb. Meter	
Raw Sample Tap	no	no	yes	
Chemical Injection Tap	yes	yes	yes	
Plant Tap	yes	yes	yes	
Appropriate Chemical Feed Outlet	yes	yes	yes	
Water Level Device	yes	yes	yes	
Pressure Gauge	yes	yes	yes	
Pressure Relief Valve			yes	

Comments:
The village is looking into the possibility of ion-exchange softening at Well #3 and has obtained a preliminary cost est. from several contractors.

WELL CONTROLS				
Run Timer				
H-O-A Switch	yes	yes	yes	
Alternating Relay				
Operating Pressure				
Control Signal Type	Press. Switch	Press. Switch	electronic press sensor	
Control System Adequate?	see comment	yes	yes	

Comments:
Wells #1 and #2 can be operated automatically or manually and are controlled by pressure sensing switches. Well #3 can be operated automatically or manually and is controlled by an electronic pressure sensor. The pump/motor is also VFD controlled and its output is set to a specific flow rate. Frequent telemetry system failures calls for the need to repair or replace the control system.

WELLHOUSE INFORMATION				
Heater / Dehumidifier	yes	yes	yes	
Floor Drain	yes	yes	yes	
Doors open out	yes	yes	yes	
Adequate Security Measures?	yes	yes	yes	

Comments:

Standby Power

WELL AUXILIARY POWER				
Well Number	Well #1	Well #2	Well #3	-
Power Type	Portable gen	Portable gen	Portable gen	
Power Rating (kWh or KVA)	60 KW	60 KW	60 KW	
Fuel Type	diesel	diesel	diesel	
Capacity (gpm)				
Horse Power (HP)				
Starting Frequency	1/wk		1/wk	
Load Testing Frequency	2/yr		2/yr	
Basis for Auxiliary Power Waiver				

Comments:

A local contractor, Cummings Bridgeway conducts yearly maintenance on the stand-by power generator. The oil and filter are changed and a load test is performed on the unit twice a year. Wells #1 and #2 can be operated simultaneously by connecting the generator to the auxiliary connection on Wellhouse #1. Well #3 (iron removal WTP) also has an auxiliary connection which will allow operation of Well #3 from the generator.

SOURCE

Isolation				
Well Number	Well #1	Well #2	Well #3	-
Approved Isolation Radius	100 ft	100 ft	100 ft	
Available Isolation Radius	<100 ft	90 ft	100 ft	
Type of Isolation Control	municipal	municipal	municipal	
GW flows from/direction			from east	
Basis for GW Flow			Hydro-geo	
Important Potential Source				
Distance and Direction				
Important Major Source			WW Lagoon	
Distance and Direction			1200 ft - ESE	
Detects	none	none	none	
Sensitivity				
Susceptibility				
Comments:				

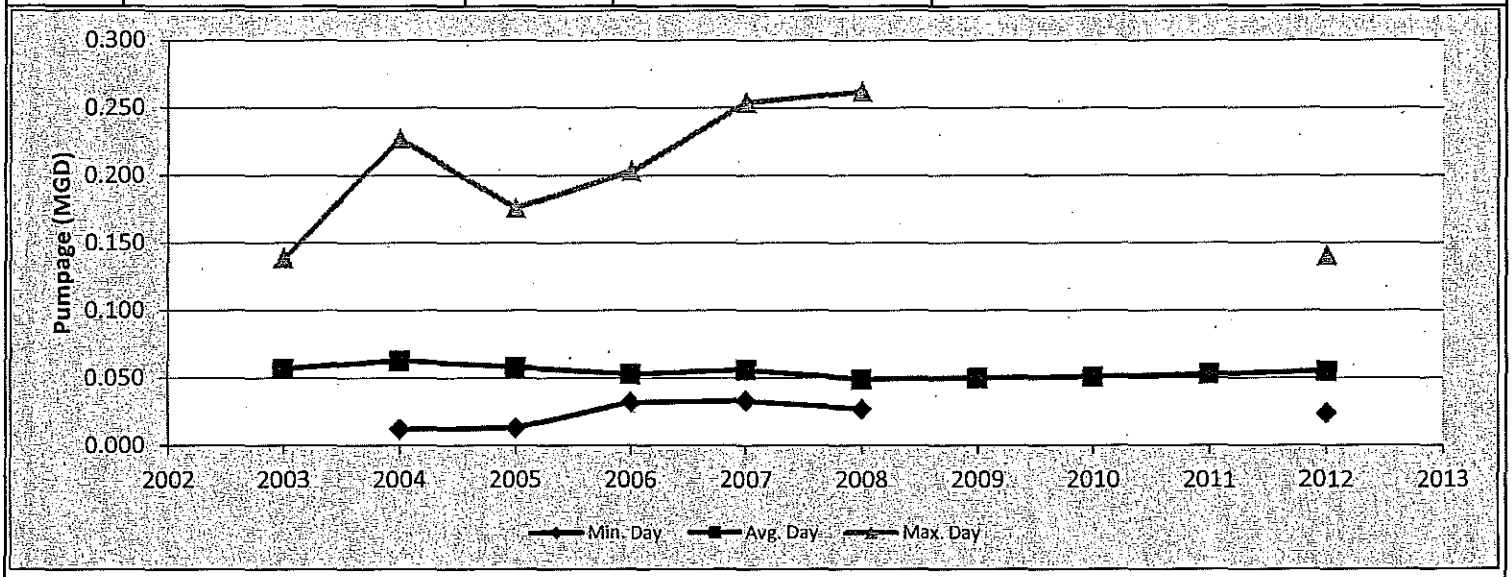
Wellhead Protection/Source Water Protection Program		
Is the Source Water Assessment available? (Y/N)		
Date of last update		
Is there an approved Wellhead Protection Program? (Y/N)	yes	
Date of DEQ approval	2006	
Have any of the following been initiated? (Y/N)		
Wellhead Protection/Source Water Protection Team		
Delineation/Tritium Designation		
Contaminant Source Inventory		
Management Strategies for Contaminant Sources/Land Use		
Contingency Plan addressing wellhead area		
Plan for phasing new wells into WHPP		
Public Participation		
What is status of wellhead delineation/tritium designation?		(ongoing, or date of DEQ action)
Have Source Water Protection efforts been initiated? (Y/N)		(if yes, briefly describe)

Comments:
Well #1 and #2 are somewhat protected by a clay layer and major sources of contamination are not present. Both wells are designated as "moderately vulnerable" to fuel petroleum compounds (VOCs) and pesticides & herbicides (SOCs). Further discussion of this and the associated chemical monitoring guidelines have been provided to the village. Well #3 appears to be adequately protected from major sources of contamination.

SOURCE

Capacity

Year	Pumpage (MGD) Max. Day	Date	Avg. Day	Min. Day	Date	Max/Avg	Population History	G/C/D	% unacct.H_2O
2003	0.139		0.057			2.438596	880	64.8	
2004	0.227		0.063	0.012		3.603175	877	71.8	
2005	0.176		0.058	0.013		3.034483	874	66.4	
2006	0.203		0.053	0.032		3.830189	871	60.8	
2007	0.254		0.056	0.033		4.535714	868	64.5	
2008	0.262		0.049	0.027		5.346939	866	56.6	
2009			0.050				865	57.8	
2010			0.051				864	59.0	
2011			0.053				864	61.3	
2012	0.141		0.055	0.024		2.563636	864	63.7	



Five Year Max. Day	0.262		
Ten year Max. Day	0.262		
Five Year Avg. Day	0.052		
Peak Hour (Hydropneumatic)			
Max Day for capacity requirements:	see comment		
Baseline Capacity	630 gpm	0.908	mgd
Total Well Capacity	605 gpm	0.872	mgd
Firm Well Capacity:	125 gpm	0.180	mgd
Firm Well Capacity/Max. Day	#VALUE!		
Peak Hour/Firm Capacity:		(Hydropneumatic w/o gravity storage)	
Total Aux. Power Well Capacity	400 gpm	0.576	mgd
Aux. Power Well Capacity/Avg. Day	1117%		

Comments:

The village will be faced with the need to replace Well #1 in the near future due to its age and condition. The village has several potential wellsites including the existing site at the DPW, the iron removal treatment plant, and a 3rd site north of Well #3 (prev. explored - future site for Well #4). Reported maximum day demands (> 0.150 mgd) have been the result of frequent telemetry control failures that resulted in large pumpage (overflowed the elevated tank). The village is investigating their water use records and the max day demands will be revised. The MDD for the village, given its customer base should not exceed 3.0 X ADD, or 150,000 gpd.

STORAGE

Construction, Controls & Maintenance	
Location	300 East Street
SDWIS Facility ID (Site Code)	
Volume	50,000 gallons
Type	multi-leg
Material	
O.F. Elevation	120 ft
Date Constructed	1949
Date Inspected	2009
Date Painted Inside	2001
Paint System	3 coat epoxy
NSF Std 61 Compliant (Y/N)	yes
Date Painted Outside	2004
Cathodic Protection	no
Tank Isolation Valve	yes
Tank Drain (Hydrant)	yes
Altitude Valve	
Mud Valve	
High Alarm	yes
Low Alarm	yes
Alarms Received By	dialer system
Total Head Range (Feet)	
Normal High Water Level	
Normal Low Water level	
Normal/Average Pressure	
Data Recording System	yes
Control Signal Type	radio telemetry
Auxiliary Power for Controls?	
Control System Adequate?	
Vents Screened	yes
Overflow Screened	yes
Access Hatches Locked	NA
Expansion Collar Lubricated	
Mixing System	no
Overflow Splash Pad	
Adequate Security?	
Operator Visit Frequency	1/day

Comments:

The elevated is not adequately sized - fire protection is limited to 30 minutes. There are no immediate plans on replacing the elevated tank. The tank was inspected in 2009 by NTEC and the tank was found to be in good condition with the paint system being more than 99% intact. The tank is due for another inspection in 2014.

Capacity			
Usable Storage	50,000		
Total Usable Storage (gal)	50000	0.050	Mgal
Total Usable Storage/Max Day	19%		
Total Usable Storage/Avg. Day	97%		

Comments:

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies? No

If yes, list WSSN number (s): NA

No. of Emergency Connections:

Location	Main Size	Capacity	Metered?	Status (Regular/Emergency)	WSSN of Connection

Are valves exercised annually? _____

Flushed? _____

Comments:

Distribution Piping

Mains by Material	
Cast Iron	1%
Ductile Iron	30%
PVC	10%
Asbestos-Cement	49%
HDPE	0%
Galvanized	0%
Concrete	0%

Mains by Size	
2"	0%
4"	40%
6"	40%
8"	20%
10"	0%
12"	few
16"	0%

Mains by Age		
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	
to	years	

Estimated percent of piping with coal tar lining 0 %

Comments:

The village has replaced sections of undersized mains including remaining 2-inch main over the past 10 years; however, an on-going water system capital improvements program is not in place. The majority of the distribution system consists of 4 and 6-inch piping and appears to be in relatively good condition.

Improvement in system hydraulics is likely needed and the extent & location of the improvements needs to be identified in a water system reliability study. The hydraulic analysis, as part of the reliability study, will need to identify areas of the distribution system that fail to maintain 35 pounds per square inch (psi) of pressure during peak demands and fail to maintain 20 psi during while providing the desired level of fire protection.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? no recent history
If yes, identify locations:

Comments:

Are there areas where aesthetic water quality complaints are frequent? few areas
If yes, identify locations: At a few dead-end main locations

Comments:

Do you receive complaints alleging illness due to the water? no
If yes, identify locations:
Comments:

Are there areas where customers complain of low pressure? no

If yes, identify locations:

Comments:

What is the procedure to respond to and track these complaints?

Comments:

Distribution System Capacity

Are there areas where peak flows (including fire flow) cannot be maintained? Yes
If yes, identify locations: Much of system is 4 and 6-inch mains

Comments:
Specific areas of inadequate flow will need to be identified in the reliability study.

Last ISO report date? 2006 Rating Class 8

Proposed distribution system improvements:

Location:	Estimated Completion Date
None	None

Comments:
The reliability study should identify distribution system improvements of which the village will need to prepare a capital improvements program.

DISTRIBUTION

Hydrants

Number of Hydrants	44		
Number Without Auxiliary Shut-Off Valves	none		
Number that are Self-Draining	few		
Number of Inoperable Hydrants	none		
Frequency of Hydrant inspection:	1/yr		
Inspection Staff:	DPW		
Are there areas where additional hydrants are needed?	no		
If yes, list locations:			
Hydrant location system	general plan	Accurate?	fair
Are hydrants color coded for capacity?	coded by main size		
Has this information been provided to the fire department?	yes		
Frequency and seasons of hydrant flushing	2/yr	per year	spring - fall
Purpose of flushing	aesthetics and to address any WQ complaints		
Is the public notified prior to flushing?	yes- billing		
Does flushing follow a specific format?	yes - from tank outward		
Is the volume of water used during flushing estimated?	indirectly		
Do hydrants receive maintenance painting?			
Is a record maintained of hydrant activities?	yes		

Hydrant records should include: Hydrant number, location of the hydrant, type of hydrant, size of barrel, size of bottom valve, size of lead, direction of turn, operable or inoperable, auxiliary valve type and size, weep holes plugged or unplugged, condition of hydrant (caps, chains, valve operation, operating nut, leakage & etc.), color coded capacity, flow data (gpm & psi) flushing dates, inspection dates.

Comments:

System flushing is typically conducted during the overnight hours. Most hydrants are the 4-inch barrel hydrant. Hydrants are located on the village's water system general plan. A more detailed card filing system with detailed hydrant information (noted above) should be compiled.

Valves

Number of Valves	30-40		
Number of Inoperable valves	some		
Are there areas where additional valves are needed?	yes		
If yes, list locations:	Center and Grove Streets		
Valve location system	yes	Accurate?	no
Valve Turning Frequencies	Primary:	see comments	
	Others:	see comments	
Records Maintained?			

Valve records should include: valve number, location of valve(with witness points), type of valve, size of valve, normal operating status (open or closed), condition of valve (operable or inoperable), direction of turn, number of turns, and dates of operation.

Comments:

Valve turning is being started - some valves are being turned in conjunction with system flushing. A card filing system is in place for valves; however more detailed information including exact location and operating status needs to to be added to the recordkeeping system. The DPW has interest in purchasing GPS to further improve valve records .

DISTRIBUTION

Customer Service Information

Number of service connections	284
Number of metered service connections	284

Percentage of service line materials:	
Copper	99%
PVC/PE/PB	<1%
Galvanized	<1%
Lead	none

Ownership of Service (CWS/Customer)	
From Corp Stop to Curb Stop	CWS
From Curb Stop to Property Line	CWS
From Property Line to Meter	CWS
Meter	CWS *

CUSTOMER METERS

Types of meters Used	Badger
Number of Meters with Remote Reading Devices	remotes outside
Residential Meter Sizes	5/8 - inch
Industrial/Commercial Meter Sizes	up to 3-inch
Meter Testing/Maintenance Program	none - tests or replaces as needed or upon complaint
Average Age of Meter in System	10 years
Criteria for Change out	inaccuracy or complaint
Number or Percent Change out per Year	approx. 10 per year
Master Meter Locations	none
Calibration of Master Meters	NA
Meter Reading Staff/Contract:	DPW

Percent of Usage by Customer Type	
% Residential	70%
% Commercial	30%
% Industrial	<1%
% Other	

Large Users - % of Use	
Laundromat, carwash, schools, firehall	

Comments:
After 2010, any resident establishing a new water connection owns the both the water service and the meter.

System Growth

Year	# of Construction Permits Issued	Permitted Amount of WM Feet
2003	0	0
2004	2	WTP, Wm repl 145 lf
2005	0	0
2006	0	0
2007	0	0
2008	1	WM repl 1000 lf
2009	0	0
2010	0	0
2011	0	0
2012	0	0

Comments:
The village has experienced no growth over the past 10 years.

DISTRIBUTION

Water Rates

What is your current rate schedule?	$19.70 + $2.32/100 cuft.
Are current rates adequate to support O&M and CIPS?	O&M - ok, CIPs - questionable
When was last time rates were adjusted?	2011
Has a water rate study been performed? When?	In-house study
Is there a meter charge or ready to serve charge?	yes - $19.70
Is a copy of the water rate schedule and ordinance available?	yes

Comments:
The village's water/sewer committee performed an "in-house" rate study which has resulted in the current rate structure. The water tap-in fee remains at $1000. The new rate ordinance allows a rate increase equal to the rate of inflation or no more than 5% per year. Village residents on private wells must also connect to village water upon failure of their well.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	yes
Repair Clamps (2 or more for each size)	yes
Tees, Crosses & Elbows	yes
Hydrants	no
Valves	yes
Services (Corp & Curb Stops, Clamps and Lines)	yes
Other	

Comments:

Safety Programs

Confined Space Entry Program	no
Trench Safety Program	no

Comments:
The village does not have a Confined Space Entry Program; however, operators do not enter such spaces. Trench and other confined space entry work is hired out.

PROGRAM COMPLIANCE

Cross Connection Programs

Ordinance No.	184	Date:	3/7/2005		
Approved Program (Y/N)?	yes	Date:	1/3/1979		
Staff Assigned to Program, (No., Dept and/or who)			DPW		
Is Annual Cross Connection report required (Y/N)?			yes		
Was previous year's annual report received (Y/N)?			yes	Date:	6/19/2012
Was previous year's annual report acceptable (Y/N)?			yes		
Inspection Status:	Active program				
Assembly Testing Frequency:	1/yr	High Hazard:	11	Low Hazard:	43
Assembly Testing Performance	some imp. needed				
Recordkeeping:	adequate				

Private Well Isolation/Abandonment Procedure:

Comments:

The DPW operators are completing the required number of inspections at the high & low hazard accounts each year. Device testing is also being confirmed for some of the high hazard establishments; however, the DPW is encountering some difficulty in achieving compliance with device testing among some of these customers. The village needs to enforce their CCCP ordinance including water shut-off for CCCP customers that remain in non-compliance with the program requirements. The village clerk assists the DWP in preparing CCCP correspondence.

Annual Pumpage Reports

Is Annual Pumpage Report required (Y/N)?	yes		
Was previous year's annual report received (Y/N)?	yes	Date:	4/14/2012

Comments:

The 2009 and 2010 pumpage reports were not received.

Monthly Operator Reports

Are Monthly Operation Reports required (Y/N)?	yes		
Were all previous year's reports received (Y/N)?	yes	Timely?	yes
Are previous year's reports acceptable (Y/N)?	see comment		

If no, describe problems:

Comments:

Plant tap chlorine residuals need to be taken and recorded in the MOR on the days that Well #1 and Well #3 are operating. Also, the combined usage on a daily basis from Wells #1 and #3 needs to be recorded in the MOR.

Consumer Confidence Reports

Is the annual CCR required? (Y/N)	yes		
Was the previous year's report received? (Y/N)	yes	Date:	6/19/2012
Was the previous year's acceptable? (Y/N)	yes		
Was the previous year's certification form received? (Y/N)	yes	Date:	6/19/2012

Comments:

Emergency Response Plan

Date of ERP	2/12/2013	Acceptable?	yes
Filed where?	village		

Comments:

PROGRAM COMPLIANCE

General Plan

Date of Most Recent Plan:	1999	
Filed Where?	MDEQ, village	Acceptable?
	General Layout	needs updating
	Facility locations & capacities	needs updating
	Water Main Inventory	ok
	Identification of Service Areas	yes
	Hydraulic Analysis	needs updating
	Capital Improvement Plan	no

Comments:
The 1999 water system general plan needs to be updated. The updated plan needs to include Well #3 and the iron removal treatment plant. An updated hydraulic analysis and a capital improvement plan also need to be included.

Reliability Study

Date of Most Recent Study:	none	
Filed Where?		Acceptable - No
Contents:	5 & 20 Year Demand Projections	
	Source Production Totals (Monthly)	
	Customer Supply Usage (Annual)	
	Res/Comm/Ind Usage (Annual)	
	Water Shortage Response Plan	
	Recommended Improvements	

Comments:
The village needs to have a water system reliability study performed and the study needs to include an updated general plan - discussed above.

Permits

Applies for and obtains permits prior to construction (Y/N):	yes	
Reviews plans prior to submittal to DEQ (Y/N):	yes	
Standard specifications on file at CWS (Y/N):		
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):		Date:
Follows master plan for any construction (Y/N):		
Develops as-built plans (Y/N):		
Updates general plans (Y/N):	no	

Comments:

MONITORING

Bacteriological

Date of Approved Site Sampling Plan	1/30/2013		
Number of samples required each month	1	Basis:	population
Certified Lab Used:	MDEQ		
MCL, Monitoring or Reporting Violation(s) in past 3 years? (Y/N)	none	Date:	
Number & Type of Violations	NA		
Public Notice Issued according to regulations? (Y/N)	NA	Date:	

Comments:

Chemical

Date of Monitoring Schedule:	2/14/2013		
Were nitrate, nitrite and fluoride (or partial chemical) samples collected? (Y/N)	yes		
If nitrate detect, what is concentration?	ND	Date:	
If nitrite detect, what is concentration?	ND	Date:	
Detects for metals > 50% of MCL? (Y/N)	Yes		
Metals (list)	Arsenic at Well 2	Date:	
		Date:	
Detects for VOCs (Y/N)	no	Date:	
Detects for SOCs (Y/N)	no	Date:	
Date of Approved Disinfection Byproduct Monitoring Plan			

Comments:

Lead and Copper Monitoring

No. of Samples Required:	10		
Frequency (Semi-Annual/Annual/Triennial)	Triennial		
Exceedance of lead or copper action level (Y/N)	no		
If yes, was public education issued? (Y/N)	NA	Date:	
Next Monitoring Period:	2015		
Corrosion Control Program Status, if applicable	NA		
Lead service line replacement status, if applicable	NA		

Comments:

Radiological Monitoring

Date of Monitoring Schedule	2/14/2013		
Alpha, beta, radium, uranium	yes	Date:	9/2/2003
Radon	yes	Date:	9/5/2001
Tritium	no	Date:	
Detects for Rads > 50% of MCL? (Y/N)			
If yes, list		Date:	

Comments:
All three wells were sampled for combine radium (Ra 226 and Ra 228) on 9/2/2003. The combined radium at all three wells were below the 5 pCi/l standard. The gross alpha collected in 2001 was 2.4 pCi/l from Well #1 and 2.1 pCi/l from Well #3.

TREATMENT (Well #1)

Disinfection

Point of Treatment (Wellhouse Name)		Well #1	Injection Point:	Well #1 - POE
SDWIS Facility ID (Site Code)				
Year Initiated		1975	Purpose:	Disinfection
Product		Sodium hypochlorite	Manufacturer:	El-Chlor
Chemical Strength		12.50%	Dilution:	fed at 12.5%
ANSI/NSF Standard 60 Approval? (Y/N)		yes	NSF max dose:	mg/L
Normal Feed Rate/Dosage		3 to 4 mg/l	mg/L	
Avg Plant Tap Residual (mg/L)	total:	0.75 mg/l	free:	0.6 mg/l
Avg Distribution Residual (mg/L)	total:	0.56 mg/l	free:	0.38 mg/l
Frequency of Residual testing	Plant Tap:	1/week	Distribution:	1/week
Analytical Method Used		Hach color wheel	Instrument:	
Any Overfeed Instances? (Y/N)		no	Date(s):	
Any Low Feed Instances? (Y/N)		no	Date(s):	
Pump Type:		Stenner peristaltic	Model:	
Number of Pumps:		1		
Pump Capacity	gpd max:	17	gpd min:	
	psi:	100		
Chemical Storage Tank Type		drum	Volume:	45 gal
Weight/Level Reading Method		weigh scale		

SAFETY

Separate Room	no	Cylinder Repair Kit	NA
Exhaust fan	no	Extra Chlorinator or repair kit	NA
Fresh Air Vent	no	Ammonia Bottle	NA
Door Opens Out With Panic Bar	no	Self Contained Air Packs	no
More than 1500 # Cl_2 onsite	NA	Training Programs	no
Electrical Protected from Gas?	no	Shower/Eye Wash	no

Comments:

Phosphate Addition

Point of Treatment (Wellhouse Name)		Well #1	Injection Point:	upstr. Of CL2
SDWIS Facility ID (Site Code)				
Year Initiated		1975	Purpose:	iron sequ.
Product		Aquadene MP 4130	Manufacturer:	
Chemical Strength		28% PO4	Dilution:	9:1 dilution
ANSI/NSF Standard 60 Approval?		yes	NSF max dose:	mg/L
Normal Feed Rate		1	mg/L	
DEQ Permitted Feed Rate or Dosage			mg/L	
Avg Plant Tap Residual (total)		see comment	mg/L	
Residual Testing Technique				
Frequency of Residual testing	Plant Tap:		Distribution:	
Any Overfeed Instances? (Y/N)		no	Date(s):	
Any Low Feed Instances? (Y/N)		no	Date(s):	
Pump Type:		Pos. displ.	Model:	Neptune
Pump Capacity	gpd max:	22.8	gpd min:	
	psi:	145		
Chemical Storage Tank Type		drum	Volume:	50 gal
Weight/Level Reading Method		weigh scale		

Comments:
Phosphate residuals will need to be monitored.

TREATMENT - Well #3

Disinfection

Point of Treatment (Wellhouse Name)		Well #3	Injection Point:	Pre-treatment & POE
SDWIS Facility ID (Site Code)				
Year Initiated		1999	Purpose:	Oxidation
Product		Sodium hypochlorite	Manufacturer:	El-Chlor
Chemical Strength		12.50%	Dilution:	fed at 12.5%
ANSI/NSF Standard 60 Approval? (Y/N)		yes	NSF max dose:	mg/L
Normal Feed Rate/Dosage		6.0 pre & 1-2 post	mg/L	
Avg Plant Tap Residual (mg/L)	total:	0.78 mg/l	free:	0.6 mg/l
Avg Distribution Residual (mg/L)	total:		free:	
Frequency of Residual testing	Plant Tap:		Distribution:	
Analytical Method Used			Instrument:	
Any Overfeed Instances? (Y/N)		no	Date(s):	
Any Low Feed Instances? (Y/N)		no	Date(s):	
Pump Type:		Peristaltic	Model:	Stenner
Number of Pumps:		1 - pretreatment, 1 -POE		
Pump Capacity	gpd max:	4.0 - pre., 1.7 - POE	gpd min:	
	psi:	100		
Chemical Storage Tank Type		drum tank for both	Volume:	45 gal pre., 30 gal POE
Weight/Level Reading Method				

SAFETY

Separate Room	no	Cylinder Repair Kit	NA
Exhaust fan	yes	Extra Chlorinator or repair kit	NA
Fresh Air Vent	yes	Ammonia Bottle	NA
Door Opens Out With Panic Bar	no	Self Contained Air Packs	no
More than 1500 # Cl_2 onsite	NA	Training Programs	no
Electrical Protected from Gas?	no	Shower/Eye Wash	no

Comments:

Phosphate Addition - none

TREATMENT

Iron/Manganese Removal

Point of Treatment (Wellhouse Name)	Well #3	Year Installed:	2004
SDWIS Facility ID (Site Code)			
Rated Capacity:	400 gpm @ 2.38gpm/s		
Oxidation Method:	CL2-		

AERATION (if applicable)

Capacity of Compressors		cfm
Air to water ratio		cfm/gpm
Number of Aerators:		

CHEMICAL OXIDATION (if applicable)

Pump Type:		Peristaltic	Model:	Stenner
Number of Pumps:		1		
Pump Capacity	gpd max:	4	gpd min:	
	psi:	100		
Product		Sodium hypochlorite	Manufacturer:	El-Chlor
Chemical Strength		12.50%	Dilution:	applied at 12.5%
ANSI/NSF Standard 60 Approval? (Y/N)		yes	NSF max dose:	mg/L
Normal Dosage:		6	mg/l	
Feed Point(s):		pre-filtration & POE		
Number of chemical day tanks and mixers:		2 feed tanks - one for pretreatment and one for the POE pt.		

FILTRATION

Detention Tank Volume:			(gals or ft^3)	
Detention Time at rated capacity:			minutes	
Filter Type (Conventional Gravity, Pressure)		Pressure		
Number of Filter Cells		one filter w. 4 cells		
Filter Size		10 ft dia X 18 ft long		
Media Depth & Characteristics		Depth	Uniformity Coefficient	Effective Size
	Anthracite	12-in		
	Sand	18-in		
	Gravel	16-in		
Backwash Frequency		1/7days	Manual or Auto?	manual
Backwash Disposal:		Adjacent detention pond then to Coe Drain -		

DISINFECTION FEED POINTS

	Available	Normal Use	Periodic Use	Dosage	
Wells	1 & 3 - yes	yes			mg/l
Pre Aerator	NA				mg/l
Prefiltration	yes	yes		6	mg/l
Post Filtration	yes	yes		1.0 - 2.0	mg/l

HIGH SERVICE PUMPING

Pump Number				
Year Installed				
Type				
HP				
Permit Capacity				
Permit TDH				
Current Capacity				
Current TDH				
Basis				
Last Complete Inspection				
Last Efficiency Test				

Comments:
The iron removal treatment system consists of a 400 gpm silica sand horizontal pressure filter provided by the Tonka Equipment Company. The total filter area is 168 sqft. (42 sqft per cell). The treatment rate is 2.38 gpm/sqft with 4 cells in service and 3.17 gpm/sqft with 3 cells in service.

Raw water iron averages around 2.0 ppm and treated water iron averages around 0.15 ppm.

One filter cell is backwashed at a time and the backwash water is obtained from the three remaining filters in service. Additional water from the distribution system can be obtained for backwash if necessary. The backwash rate is 15gpm/sqft. Backwash water is discharged to a temporary detention pond to allow the solids to settle out. Settled water is discharged to the Coe Drain in accordance to NPDES Permit MIG640000 - Certificate of Coverage MIG640235. The operator is authorized to conduct self-retained monitoring.

The raw water iron concentration has a wide fluctuation range (1.5 to 3.0 ppm) which makes it difficult to maintain optimal treatment and consistent plant tap chlorine residuals. A continuous chlorine analyzer was installed on the treated side of the iron removal treatment system and upstream of the second chlorine feed point. The analyzer controls the feed rate of the second chlorine feed point such that it can't exceed 2 ppm dosage.

Peerless-Midwest recently performed a core sampling of each filter cell and found the media to be in good condition. A copy of the inspection report is pending.

The filter run length is approximately 7 days and the treatment plant operates only when Well #3 is in service. Operation of Wells 1 and 3 alternate; thus, only half of the water sent to the distribution system is treated for iron.

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT
JENNIFER M. GRANHOLM
GOVERNOR
LANSING DISTRICT OFFICE
REBECCA A. HUMPHRIES
DIRECTOR

February 9, 2010

Mr. Dave Tatrow
Village of Otisville
300 East Street, P.O. Box 6
Otisville, Michigan 48463

WSSN #5050

Dear Mr. Tatrow:

SUBJECT: Otisville Water System

This letter confirms my visit with you on January 20, 2010. The purpose of the visit was to update the Otisville 2007 water system evaluation. Specific water system concerns were noted during the evaluation and these are discussed below in more detail.

1. The village's Cross Connection Control Program (CCCP) has declined to a marginal status. Although an adequate number of routine inspections are being completed each year, device testing has not been performed since 2006.

   As we discussed, an important component of the CCCP is to confirm that all testable cross connection control devices are tested at least once every 5 years. Yearly testing should be performed on devices that are located in higher hazard applications. All testable devices need to be tested by an individual who is certified to test backflow prevention devices. Enclosed is a list of certified backflow preventer testers in Genesee County. This list should be provided to your customers that are required to have their backflow preventer devices tested.

   Next, the minimum device testing frequency will be increased to once every 3 years beginning January 1, 2011. The village's cross connection control program will need to be updated to reflect this change in the device testing requirement. Device testing needs to resume in 2010 in order to prevent further decline in the village's CCCP rating.

2. The village continues to adequately maintain the existing elevated tank. The tank's interior and exterior were repainted in 2001 and 2004 respectively and an inspection was performed in 2009. The inspection revealed that the tank and its paint systems are in good condition and a re-inspection was recommended in five years. We encourage the village to continue maintaining a good preventative maintenance program for the elevated tank.

3. The village's water system contingency plan and sample site plan were recently updated. Although the updated contingency plan appears acceptable, an emergency response plan (ERP) needs to be prepared in place of the contingency plan. The ERP provides an outline to follow in the event of a water related emergency (loss of pressure, contamination, etc.). An ERP template was provided to you during the site visit and can be used for preparing Otisville's plan. We will review the completed ERP during our next routine site visit. Finally, the bacteriological sample site plan will also be updated to reflect the new groundwater rule requirements.

4. Based upon our review of the monthly operation reports (MORs), water treatment plant parameters including raw water/plant tap iron concentrations and plant tap chlorine residuals are being monitored only several times each month. These parameters need to be monitored and recorded on a daily basis (for the days that the treatment plant is in operation) since they play an important role in treatment optimization. Next, plant tap chlorine residuals also need to be monitored and recorded in the MOR on a daily basis at Well #1.

5. It is our understanding that a continuous chlorine analyzer is being installed at the treatment plant's point of entry as a means to adjust raw water chlorination. The need to adjust raw water chlorination is attributed to frequent changes in the raw water iron concentration. Increases in raw water iron results in less than optimal iron removal and low chlorine residuals in the distribution system. Decreasing raw water iron concentration would often result in high chlorine complaints.

   We agree that the analyzer will allow chemical pretreatment to respond much faster to changes in raw water iron and should help improve treatment. As we discussed, more frequent treatment plant parameter monitoring (discussed in Item #4) will be needed to verify the effectiveness of the analyzer and overall treatment.

6. A filter preventative maintenance program should be established for the treatment plant filters since the facility has been in operation for approximately 5 years. The maintenance program should be based upon the manufacturer's recommendation for filter maintenance. Major items to consider include; frequency of filter inspections, method and scope of the inspections, and overall preventative maintenance. We recommend that the village consult with the manufacturer of the filter for assistance in establishing this type of program.

7. According to our records, a water system reliability study has not been performed. Although we have not enforced the need for the village to have a reliability study performed, further review of our records show that the village has not completed any type of water system analysis. Also, it does not appear that the village has any capital improvements program (CIP) in place for water distribution system improvements.

   Although residential and commercial development has been very limited, the village needs to have a water system reliability study performed. The study will help to identify various capital needs and determine the direction that the village should proceed. The study should also serve as the basis for establishing a CIP. Enclosed is a list of items that should be included in a water system reliability study. Finally, we would be interested in meeting with you and your consultant to discuss the scope of the study in more detail.

8. The village is required to maintain an S-4 and D-4 level of certification. Our records show that you currently hold the S-L and D-3 certification; thus, the village meets the operator certification requirement. Although you hold a D-3 certification, your remaining operators do not hold any D (limited treatment) certification. In the event that you're not available (vacation, illness, etc), the village will not have a properly certified operator to oversee the water treatment system. The village needs to promote advancement in operator certification for the remaining operators such that they can obtain their limited treatment certification.

Next, Well #3 along with the iron removal treatment system is utilized slightly less than 50% of the time. This lower use is attributed to the high hardness at Well #3 and difficulty optimizing treatment. Given the age of Well #1, the village will likely face the need to replace this well in the future and/or provide additional source capacity at or near the treatment plant. As we discussed, an off-set well adjacent to Well #1 could be considered; however, there may be some site limitations at this location. Additional source capacity at or near the iron removal treatment plant may suggest subsequent softening if the village wishes to maintain the same level of aesthetic water quality. These are future considerations that the village will need to prepare for and is worthy of discussion in the village's reliability study.

Finally, the village's water rate structure may not be sufficient in generating the revenue needed to establish and complete water system capital improvements. It may be worthwhile for the village to consider pursuing assistance through our Revolving Loan and Operator Certification (RLOC) Section towards completing a financial assessment. The assessment will help your community in establishing a rate structure that may allow for distribution system improvements. For further information on this program and/or to proceed further with the assessment, please contact Robert Schneider of the RLOC Section at (517) 373-4761.

Following completion of the financial assessment, the village should prepare a distribution system CIP. Once again, the CIP would be based upon the recommendations brought forth from the reliability study.

We will continue to rate the Otisville water system as "**Satisfactory**"; however, improvement in the village's CCCP, completion of the reliability study, and establishment of a water system capital improvement program are needed to maintain this rating.

If you have any questions regarding the above items or on any other water related matter, please call me at the number provided below.

Sincerely,

Michael F. Prysby, P.E.
District Engineer
Water Bureau
Lansing District Office
(517) 335-6122

MFP:SMB

cc: Ms. Andrea Barder, Clerk, Village of Otisville

Village of Otisville
WATER SYSTEM REVIEW
2010

WSSN 5050 Supply Village of Otisville County Genesee

Date 1/20/10 Reviewed by MFP District 11

Primary Contact:	Dave Tatrow	Copy To:	Andrea Barder
Title:	Village Manager	Title:	Village Clerk
Telephone:	(810) 631-4680	Telephone:	(810) 631-4680
Address:	300 East Street P.O. Box 6 Otisville, MI. 48463	Address:	Same

Population: 882 Year: 2000 Basis: 2000 Census

Distribution Classification:	S-4	Cert.
Operator in Charge:	Dave Tatrow	S-L
Other Operators:	Bob Jennings	S-4
	Dan Campbell	None
Treatment Capacity:	0.93 MGD	
Treatment Classification:	D-4	
Operator in Charge:	Dave Tatrow	D-3
Other Operators:	Bob Jennings	none
	Dan Campbell	none

Comments:

Otisville is a small rural community that utilizes groundwater (three wells) as its water supply source. Well #2 is limited in capacity and produces water with arsenic that exceeds the revised MCL, thus this well is not in routine use. Well #1 and Well #3 are used for routine operation. Iron removal treatment is provided at Well #3. Well #1 has chlorination and phosphate feed.

Water is piped into a small distribution system. 50,000 gallons of elevated storage is also provided.

WELL INFORMATION

Well Number	Well 1	Well 2	Well 3
+Well Status	Op.	St-by	Op.
+Treatment?	CL2, PO4	CL2, PO4	Fe. Rem
P.O.E. I.D.#			
+Treatment?			
Year Installed			1998
Grouted?			
Rock or Drift	Rock	Rock	Drift
Total Depth	415 ft	350 ft	177 ft
Casing Depth			147 ft
Casing Diameter	10 in	10 in	12-in
Gravel Pack Dimensions			12X18-in
Gravel Pack Material			
Screen Length			30 ft
Screen Diameter			12-in
Screen Slot Size			
Pump Setting	200 ft	230 ft	147 ft
+Static Water Level	45 ft		6 ft
+Pumping Water Level (24 hr)			26 ft
Pumping Water Level (100 day)			30 ft
+Pump Type	Sub	Sub	V. Turb
Permit Capacity			400 GPM
Permit TDH			425 ft
+Current Capacity	150 GPM	80 GPM	400 GPM
+Basis			
Current TDH			
HP	15	20	
+Last Pulled For Inspection	2005	1994	New in 99
Last Efficiency Test	2005	1994	New in 99
Well Seal	Yes	Yes	Yes
Casing 12" Above Grade	Yes	Yes	Yes
Pump to Waste Piping	Yes	Yes	Yes
- Screened or Capped?	Capped	No	Capped
Air/Vac Relief	NA	Yes	Yes
- Screened?	NA	No	Yes
Casing Vent	Yes	Yes	Yes
- Screened?	Yes	Yes	Yes
Check Valve	Yes	Yes	Yes
Meter	Yes	Yes	Yes
Raw Tap	No	No	Yes
Chem Tap	Yes	Yes	Two
Plant Tap	Yes	Yes	Yes
Chem Feed Outlet	Yes	Yes	Yes
Heater	N. Gas	Ele.	Propane
Water Level Device	Yes	Yes	Yes
Pressure Gauge	Yes	Yes	Yes
Floor Drain	Yes	Yes	Yes
Doors Open Out	Yes	Yes	Yes

The pump and motor at Well #1 was replaced with a new submersible pump in late 2005. Also, the Aqua-Stream Suction Flow Control device installed around the well casing was no longer intact. The residual material was removed from the well. Well #3 is due for routine pump and motor maintenance.

Well #1 and #3 alternate in operation. Although iron removal treatment is provided; Well #3 is high in hardness; thus water production is alternated between each well every other day.

WELL INFORMATION

WELL AUXILIARY POWER: No permanent mounted stand-by power unit is available

PORTABLE AUXILIARY POWER: One portable generator can be utilized for any one of the three production wells.

Unit Number or Brand	Wells 1 or 2 or 3
+Fuel Type	Diesel
HP	60 KW
Starting Frequency	Sev times/yr
Load Testing Frequency	2x/yr

Comments:

A local company performs yearly maintenance on the stand-by power engine. The oil and filters are changed and a load test is performed on the unit twice a year.

Routine pump and motor maintenance should be performed on Well #3 within the next 1-3 years.

ISOLATION:

Well Number	1	2	3
Approved Standard Isolation Radius	100 ft	100 ft	100 ft
Available Isolation Radius	<100 ft	90 ft	<100ft
Type of Isolation Control	Municipal ownership		
Approved WHP Plan?	Yes	Yes	Yes
GW Flows from			East
+Basis			Hydro-geo
Important Potential Source			WW Lagoon
Dist. and Dir. from Well			1200 ft ESE
Important Major Source			
Dist. and Dir. from Well			
Detects	None	None	None

Comments:

The village's Wellhead Protection Program was approved in 2006.

VULNERABILITY ASSESSMENT

The village's previous well was relatively shallow and was completed in a sand and gravel aquifer. A nearby sand & gravel quarry impacted the water quality of this well and it could no longer be used. Wells 1 & 2 are somewhat protected by a layer of clay in the area and major sources of contamination does not appear to be present. Both wells are designated to be "moderately" vulnerable to fuel petroleum compounds (VOCs) and pesticides & herbicides (SOCs). Further discussion of this and the associated chemical monitoring guidelines have been provided to the village.

Well #3 appears to be adequately protected from major sources of potential contamination.

The village has an approved Wellhead Protection Program in place.

PRODUCTION AND STORAGE REQUIREMENTS

Production History (units in MGD)

YEAR	Avg Day	Max Day	Avg Day Max Mo.	Max/Avg	G/C/D	% UnAcct H20
2000	0.061	0.161	0.071	2.64	69	
2001	0.073	0.264	0.089	3.61	83	
2002	0.059	0.113	0.078	1.92	67	
2003	0.057	0.139		2.44	65	
2004	0.063	0.227		3.60	71	
2005	0.058	0.176		3.03	66	
2006	0.053	0.203		3.83	60	
2007	0.056	0.254		4.54	63	
2008	0.049	0.262		5.35	56	
2009	0.049				56	

Five year Max Day 0.262 MGD Date 7/11/01
Five year Avg Day 0.053 MGD

Max Day for capacity requirements 0.262 MGD

Comments:

Water demands have decreased slightly during the 10 year period beginning in 2000.

Well Capacity

Total Well Capacity 630 gpm 0.91 mgd

Firm Well Capacity 230 gpm 0.331 mgd

Max Day/Firm Capacity 79.1 %

Total Auxiliary Power Well Capacity
400 gpm - #3 0.576 mgd
150 gpm - #1 0.216 mgd

Aux Power Well Capacity/Avg Day 1087 %

+Basis of Auxiliary Power Waiver Na

Comments:

Provisions for stand-by power is available at Well #1 and Well #3.

The village is currently not planning to construct a second new well (Well #4) adjacent to Well #3 due to the high total hardness at this location.

PRODUCTION AND STORAGE REQUIREMENTS

Storage Capacity

	Location: East Street
	Fac. ID #
Volume	50,000 Gal
+Type	
O.F. Elevation	120 ft above ground surface
Date Constructed	1949
Date Inspected	2009
Date Painted Inside	2001
Paint System	Epoxy
Date Painted Outside	2004
Cathodic Protection	No
High Alarm	Yes
Low Alarm	Yes
+Type	Phone lines

Total Usable Storage 50,000 gal. 0.05 mil. gal.

Total Usable Storage/Max Day 36.0 %

Total Usable Storage/Avg Day 80.0 %

Comments:

The tank is undersized and is not capable of providing adequate fire protection for much more than 30 minutes. The village does not have any immediate plans on replacing the elevated tank.

The tank was inspected in 2009 by NTEC. The inspection revealed that the tank is in good condition and the paint systems were more than 99% intact. A re-inspection should be performed in approximately 5 years.

DISTRIBUTION

Interconnections With Other Supplies

Is water purchased from other supplies? no

Distribution Piping

Identify distribution piping materials -

PVC	app 10%
D.I.	app 30%
C.I.	app 1%
AC	app 49%
Concrete	None

Estimated percent of piping with coal tar linings: None

Identify distribution pipe sizes -

2-in	none
4-in	40%
6-in	40%
8-in	20%
10-in	None
12-in	Trans

Discuss the following as needed…

Are there areas where water main breaks are frequent? few

Are there areas where customers complain of low pressure? No

Are there areas where aesthetic water quality complaints are frequent? Yes

Comments:
Most complaints occur in the vicinity of Maplewood and Lake Streets. This location is in an area that receives water from both sources (Well #1 and Well #3). Some valving changes and more frequent flushing are being conducted to help alleviate the complaints in this area.

Are there areas where fire flows cannot be maintained? Yes

Comments:
Fire protection is marginal throughout the village due to the limited size of the elevated storage tank.

Last ISO report date? 2006? Rating? Class 8

An ISO test/report was completed within the past 2-3 years. A copy of the report was not available at the time of the evaluation.

Which, if any, of the above listed areas has the supply prioritized for main replacement, upgrading or looping? Also, if a definite schedule for capital improvement has been established, list the proposed completion date.

Comments:

At this time the village does not have a CIP program in place for water distribution system improvements however, the village has replaced sections of undersized mains over the past 10 years. This includes elimination of any remaining 2-inch watermain.

General Distribution Comments:

The majority of the distribution system consists of 4 and 6-inch piping. Although some of this piping is small, it appears to be in relatively good condition. The village has eliminated numerous dead-end mains over the past 15 years. There is also some 8-inch piping for transmission.

It appears that some hydraulic improvements may be needed. The extent and location of these improvements should be determined prior to completing them. It has been recommended to the village to proceed with a water distribution system study that would include a hydraulic analysis of the piping network. The study would identify the weak points in the system and would provide recommendations for improvements. It does not appear that a water system study will be performed in the near future.

Distribution Appurtenances

Hydrants

Number of hydrants	40-45
Number without auxiliary shut-off valves	None
Number that are self-draining	few
Number of inoperable hydrants	None

Frequency of hydrant inspection: at least 1/year

Inspection staff: DPW

Comments:

Several new hydrants were provided as part of Park Street watermain Replacement.

Are there areas where additional hydrants are needed? No

Hydrant location system? Gen Plan Accurate? ok

Are hydrants color-coded for capacity? Coded by size of main

Has this information been provided to the fire department? Yes

Frequency and seasons of hydrant flushing? 2/yr Spr./Fall

Purpose of flushing? Aesthetics and to address water quality complaints

Is the public notified prior to flushing? No

Does flushing follow a specific format? Yes, from the tank outwards

Is the volume of water used during flushing estimated? Indirectly

Is a record maintained of hydrant activities? Yes

Comments:

The water system operators maintain hydrant activity records. A card filing system for hydrants is in place.

Valves

Number of valves 30-40
Number of inoperable valves few

Are there areas where additional valves are needed? Yes

+If yes, list locations:

Center and Grove Streets

Valve location system? Yes Accurate? Yes

Valve Turning Frequencies:

Valve turning is not being conducted since operating the older valves has resulted in additional leakage and need for repair.

Records maintained? A card filing system has been completed

Comments:

A card filing system for isolation valves is in place. All valves are numbered accordingly in the filing system.

Any inoperable valves or valves that leak are repaired or replaced.

Customer and Service Information

Number of service connections approx. 280
Number of metered service connections approx. 280

Identify service line materials and estimate percentages:

Copper	100%
Gal	<1 %
PVC	<1 %
Lead	None

Two 2-inch plastic services serving two commercial establishments exist.

Ownership of Service (CWS/Customer)	
From Corp Stop to Curb Stop	CWS
From Curb Stop to Property Line	CWS
From Property Line to Meter	CWS
Meter	CWS

Customer Meters

Types of Meters Used	Badger
Number of meters w. touch pads or other Remote reading devices	Remotes outside
Size of meters	
Residential	5/8 inch
Industrial/Commercial	up to 3-in
Meter Testing/Maintenance Program	resp to compl
Average age of meter in system	10 years
Criteria for change-out	in-operable
Number of Percent Changeout per year	10%/yr
Master Meter Locations	None
Calibration of Master meters	NA
Meter Reading Staff/Contract	DPW operators

Approximately 30 meters are replaced each year. A few of the older Carlyon meters remain.

Pumpage Distribution

% Residential	70%	
% Commercial	30%	
% Industrial	<1%	
% Other		
% Large Users - List		Laundromat, carwash
		Schools, firehall

There have not been any significant changes with the village's metering program.

PROGRAMS AND PLANS

Cross Connection Program

Ordinance No. 184 Date 3/7/05

Approved Program? Yes Date 01/03/79

Staff assigned to program DPW

Is Annual Cross Connection Report required? Yes

Was previous year's annual report received? Yes Date 3/6/09

Was previous year's annual report acceptable? See comment

Inspection Status: Routine inspections have resumed

Device Testing Frequency: See comment

Record Keeping: Records have been updated for existing accounts

Comments:

The village continues to perform routine cross connection inspections. The local ordinance has also been updated to include device testing; however, none of the 10 testable devices has been tested since 2006.

Annual Pumpage Reports

Is Annual Pumpage Report required? Yes

Monthly Operation Reports

Are Monthly Operation Reports required? Yes

Were all previous year MORs received? Yes Timely? ok

Are previous year's MORs acceptable? Yes

Consumer Confidence Reports

Is the annual CCR required? Yes

Was the previous year's report received? Yes

Was the previous year's report acceptable? Yes

Was the previous year's certification form received? Yes

System Growth

Year	No. of Residential Meters Installed	No. of Comm/Ind Meters Installed	No. of CPs Issues	Permitted Am of WM Feet
1996	1/yr	None	None	None
1997	1/yr	None	1(well)	None
1998	1/yr	None	1	2500 ft
1999	1/yr	None	None	None
2000	1/yr	None	None	None
2001	1/yr	None	1	Ele. tank
2002	1/yr	None	None	None
2003	1/yr	None	None	None
2004	1/yr	None	2	WTP, Wm repl
2005	1/yr	None	None	None
2006	nill	None	None	None
2007	nill	None	None	None
2008	nill	None	1	Wm repl
2009	nill	None	None	None

Water Rates

What is your current rate schedule?	$17.87 base + $2.10/100 CuFt.
Are current rates adequate to support O&M And CIPs?	Yes
When was the last time rates were adjusted?	July 2009
Water rate study? When?	In-house study
Meter or ready to serve charge?	Yes - $17.87
Water rate sched/Ordinance available?	Yes

Comments:
The village's water/sewer committee completed an additional "in-house" rate study and passed the 2009 rate increase. The village's tap-in fee remains at $1,000. The new rate-ordinance also allows the village to increase their water rate equal to the rate of inflation or no more than 5% per year. The ordinance also requires village residents on private wells to connect to municipal water upon failure of their well.

Repair Parts Inventory

Extra Mains (sect. For each size in service)	Yes
Repair clamps (2 or more for each size)	Yes
Tees, Crosses & Elbows	Yes
Hydrants	No
Valves	Yes
Services(corps, curb stops, clamps & lines)	Yes

Safety Issues

Confined space entry program in place % followed (Y/N)	No
Trench safety program in place & followed (Y/N)	No

Comments:
The village does not have a Confined Space Entry Program in place however, operators do not enter such spaces. BJ and Dave attended Rural Water's trench safety class recently.

Contingency Plan

Date of most recent plan : Jan 2010 Acceptable? Being updating

Filed where? DNRE, Village

Comments:
The village's 2010 contingency plan needs to be updated to an emergency response plan.

General Plan

Date of most recent plan Jan 1999 Acceptable? Yes

Filed where? MDEQ, DPW

Reliability Study

Date of most recent study none Acceptable? No

Comments:

A reliability study needs to be performed.

Bacteriological Monitoring

Date of approved sampling site plan: Jan 2010

Are samples still being collected in accordance with the plan? Yes

Number of samples required each month: 1
Basis for setting number of monthly samples: pop.
Certified lab used: MDEQ

MCL, Monitoring, or Reporting Violations in Past 60 months? Yes

Quarterly As mon. violation early 2005
Bacti mon. violation Nov. 2005
DBPR mon. violation 2006

Chemical Monitoring

Date of Monitoring Schedule: Feb 09

Are samples collected in accordance with the schedule? Yes

Were nitrate, nitrite and fluoride (or p chem) samples collected: yes

If nitrate detect, what is concentration? ND
Sample site POE (2009)
If nitrite detect, what is concentration? ND
Sample site POE (2009)

Detects for metals >50% of MCL? Yes
Metals (list) Arsenic @ approx 3-5 ppb

Detects for VOCs? No
Detects for SOCs? No

Date of approved DBPR monitoring plan? NA
DBP sampling done? Yes - since 2007
If yes, done to sampling site plan? NA

Lead & Copper Program

The village continues triennial monitoring (6/1/09 - 9/30/09 period). The village has met both action levels since the start of this program.

The next round of triennial monitoring needs to be completed in 2012, specifically between 6/1/12 and 9/30/12. 10 samples are due.

Radiological Monitoring Program

Date of monitoring schedule: Feb 09

Are samples being collected in accordance with the schedule? Yes

Alpha, beta, radium, uranium	Yes	Date collected:	9/5/01
Radium 226 & 228	Yes	Date collected:	9/2/03
Tritium	No	Date collected:	

Detects for Rads >50% of MCL? (Well #1)	Gross Alpha:	2.4 pCi/L
	Ra 226:	1.3 pCi/L
	Ra 228:	0.8 pCi/L
Detects for Rads >50% of MCL? (Well #3)	Gross Alpha:	2.1 pCi/L
	Ra 226:	0.2 pCi/L
	Ra 228:	0.6 pCi/L

Treatment

Disinfection

Points of Entry ID # Well #1& #3

Year initiated: 1975

Purpose: disinfection

Location of disinfection point: Wellhouses discharge piping

Compound & Concentration: 12.5% Sodium Hypo-chlorite, El-Chlor

ANSI/NSF Standard 60 Approval? Yes

Feed Rate: 4-5 ppm (Well #1)
7-8 ppm (Well #3)

Chlorine residual meas. tech.: Hach DPD Kit

Avg Plant tap residual (free): 0.1 - 2.0 ppm

Avg Plant tap residual (total): 0.15 - 2.2 ppm

Avg distribution residual (free): 0.7 ppm

Avg distribution residual (total): 1.0 ppm

Frequency of residual testing: P-Tap < weekly

Pump capacity: 24 gpd max @ 110 psi

Type: LMI positive displacement pump, A151-91s (Well #1)
LMI positive displacement pump, C721-368HI - 96 gpd @ 100 psi (Well #3)

Overfeed instances? None

Plant tap chlorine residuals at the iron removal treatment plant are not being measured frequently enough. Plant tap chlorine residuals are not being measured at Well #1.

Phosphate Addition:

Points of Entry ID#: Well #1

Year initiated: 1951

Purpose: Iron control

Location of injection point: wellhouses, upstr. Of CL2

Compound & Concentration: Elhorn

ANSI/NSF Standard 60 Approval? Yes

Feed Rate: 1.20 ppm

Pump Capacity: 2.5 gph max@ 100 psi

Type: Neptune positive displacement pump

Iron Removal Treatment (at Well #3)

Plant Address:

Wilson Road approximately 1 mile west of the village limits.

Construction Features and Dates:

The iron removal treatment plants was constructed in 2004 and placed into service in 2005.

Plant Design Capacity:

400 gpm silca sand filtration with a horizontal pressure filter provided by the Tonka Equipment Company. The pressure sand filter is 10 feet in diameter by 18 feet in length and consists of 4 cells. The filter area is 168 sqft (42 sqft per cell). The treatment rate is 2.38 gpm/sqft with 4 cells in service and 3.17 gpm/sqft with 3 cells in service.

Plant Rated Capacity:

400 gpm at 2.38 gpm/sqft of filter area

WATER QUALITY

From Monthly Operation Reports:

	RAW		TREATED	
	Average	Range	Average	Range
Iron (ppm)	1.8	1.5 -3	0.25	0.2-0.5

Raw water and plant tap iron concentrations need to be monitored more frequently.

Monitoring Requirements:

Water treatment process parameters (CL2 residuals, iron concentrations need to be monitored on a daily basis (for the days that the treatment plant is in operation).

IRON REMOVAL TREATMENT PLANT FACILITIES

Raw Water Metering:

Well #3 serves the iron removal plant and the well is metered.

PUMPS AND PUMP LOCATIONS

The iron removal treatment plant utilizes pressure filters and the well pump acts as the treatment plant pump.

Backwash:

One filter cell is backwashed at a time and the backwash water is obtained from the three remaining filter cells in service. Additional water from the distribution system can be obtained for backwash if necessary. The backwash rate is 15 gpm/sf.

Backwash water is discharged to a temporary detention pond to allow the solids to settle out. The settled water is discharged to Coe Drain in accordance to NPDES Permit MIG640000 - Certificate of Coverage MIG640235. The operator continues to discharge in accordance to the discharge limits set forth in the permit. The operator is authorized to conduct self-retained monitoring.

PRETREATMENT FACILITIES

Type of Units: Pre-chlorination - see CL2 above

The raw water iron concentration has a wide fluctuation range (1.5 to 3.0 ppm. This fluctuation has made it difficult to maintain optimal treatment and consistent plant tap chlorine residuals. A continuous chlorine residual analyzer is being installed to monitor the plant tap chlorine residual. The analyzer will also be used to control the chlorine feed rate based upon the plant tap residual. A free plant tap residual of approximately 0.75 ppm will be the established set-point.

Physical Condition:

The facility was constructed in 2005 and is in good condition.

FILTRATION

Number and Area of Filter:

One filter consisting of four separate filtering cells.

Filter Media:

12-inch bed of anthracite
18-inch bed of filter sand
16-inch bed of graded gravel

Uniformity Coefficient:
Effective Size:

Date Last Rebuilt or Checked: New in 2005.

The filter media has not been checked since the treatment system was placed into operation in 2005. The village should consult with the filter manufacturer for their recommendation on filter maintenance.

Filter Performance Records: None

Filter performance records need to be established.

Underdrain Type:

3/8 inch curved bottom underdrain with Tonka high impact ABS diffuser nozzles approximately 12-inches on center.

Backwash Requirements:

- Air problems - None
- Rise rate - At 630 gpm (15 gpm/sqft)
- Normal length of wash - 15 minutes, approx 10,000 gallons per wash.
- Available sand expansion - 2 feet
- Normal bed expansion - Not determined
- Disposal of backwash water - detention pond then to Coe Drain.
- Criteria used for backwash - Length of filter run - typically one backwash every 10 days.

Rate of Flow Devices:

Filtered Water: turbine meter

Backwash Water: orifice plate

Length of Filter Runs:

The filter run length is approximately 10 days. The WTP operates only when Well #3 operates. Operation of Wells 1 and 3 alternate thus, only half of the water sent to the distribution is treated for iron. The treated water effluent iron concentration ranges between 0.2 and 0.5 ppm.

Associated Problems and Causes:

- Mudballs - Not determined
- Air Binding - Not determined
- Cementing - Not determined
- Gravel Mounding - Not determined
- Media Loss - not determined
- Cracking - Not determined
- Media Growth - Not determined
- Media Attrition - Not determined
- Bacteria Growth - Not determined
- Uniform Backwash - Appears adequate
- General Problems - None experienced

The treatment plant has been in service for approximately 5 years; however, there has not been an inspection of the filter media to determine whether any of the above filtration problems may exist. The village should consult with the manufacturer (Tonka) for assistance in conducting an inspection of the filter media.