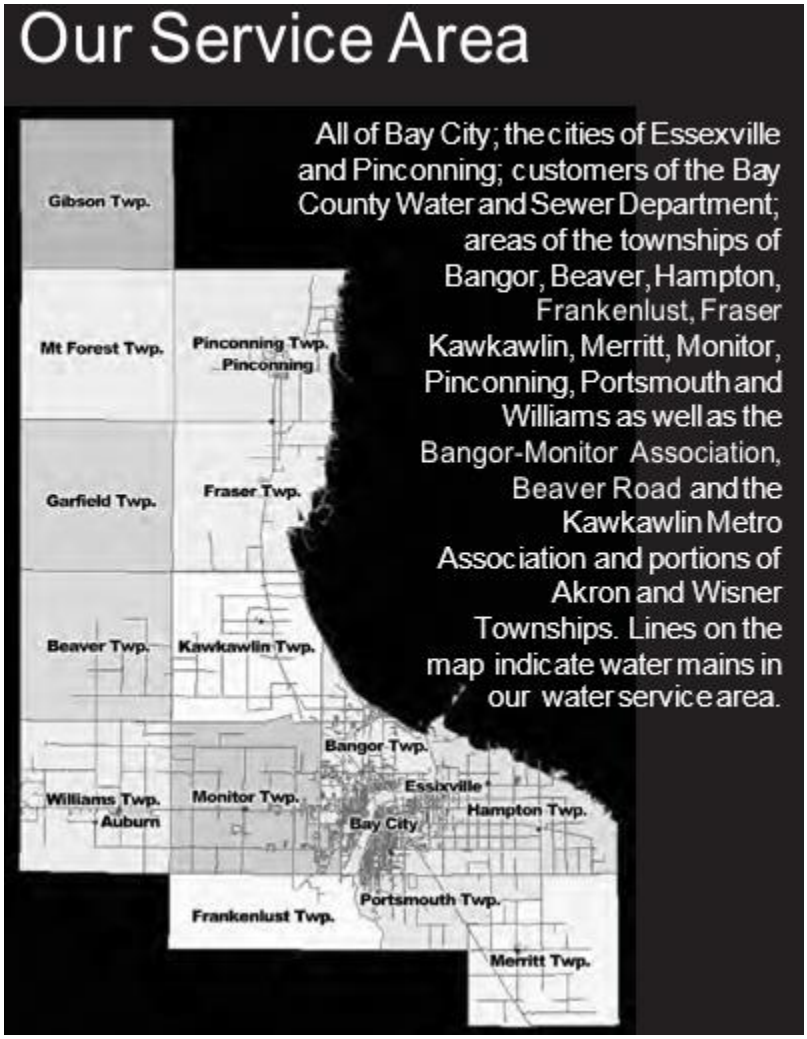
Bay Area Water System 2015 Quality Report

Safe Drinking Water - Our Most Important Goal

Delivering safe drinking water to nearly 100,000 customers who rely upon us every day is the number one goal of the operators and supervisors at the Bay Area Water Treatment Plant, and of the water systems that purchase and distribute water throughout Bay County. This Annual Water Quality Report will be of interest to you if you consume drinking water from the public water supply in our service area. This report contains water quality data from both the Bay City Municipal Water Treatment Plant and the new Bay Area WTP, along with results from the distribution system for calendar year 2015, unless stated otherwise.



History

The City of Bay City was the water purveyor or water supplier for most of Bay County for over 130 years dating back to the 1880's. Starting in the 1970's, the Bay City Municipal Water Treatment Plant located on Euclid Avenue near Lauria Road was put into operation. This facility was one of the first water plants in the United States to utilize ozone in the treatment process and was deemed an advanced water treatment facility. It was decommissioned in 2015 and replaced with the Bay Area Water Treatment Plant.

The New Bay Area Water Treatment Plant

The evolution of the Bay Area Water Treatment Plant began over a decade ago in an atmosphere of ever tightening water quality standards and regulations. Early discussions regarding the future of water in the community centered on identifying the best water source and water treatment process to serve the area for many years into the future. Available raw water sources, rehabilitation of the Bay City Municipal Water Treatment Plant, and construction of a new membrane filtration plant were studied extensively. An agreement in principle in early 2011 with the Saginaw-Midland Municipal Water Supply Corporation (SMMWC) to supply raw water to a joint "Bay City/Bay County" facility was a milestone achievement. It then became clear that constructing a new membrane filtration plant with the SMMWSC raw water source would provide the most economical approach to delivering high quality water to the community.

Continuing discussions resulted in the unprecedented cooperation of local governments and culminated in a historic Water Supply Agreement signed on January 30, 2013 by 14 units of government in Bay County. Design and construction of the Bay Area Water Treatment Plant began and continued as a top priority of the Bay County Road Commission and its Department of Water and Sewer. The Bay Area WTP partnership formed by the Water Supply Agreement will deliver high quality water to the partner's combined customer base for the next 40 years and beyond.

The new Bay Area Water Treatment Plant came to life on August 31, 2015 and began delivering outstanding water to nearly 100,000 people in 19 public water supply systems throughout the greater Bay County Area. This facility is the largest membrane filtration plant in the State of Michigan! Key to delivering high quality water from the new, state-of-the-art, membrane filtration plant is high quality raw water supplied by the Saginaw-Midland Municipal Water Supply System. The Saginaw-Midland System's Whitestone Point facility near AuGres draws raw water from Lake Huron, a far more consistent and superior raw water source than was utilized at the former Bay City Municipal Water Plant that previously supplied water to the community. Exceptional quality raw water and state of the art membrane technology result in exceptional water being delivered to the homes and businesses in 3 cities, 12 townships, 3 water associations, and the county system that has water furnished and delivered from the new Bay Area WTP. Bay Area WTP customers are now able to enjoy an excellent quality water supply.

Source Water

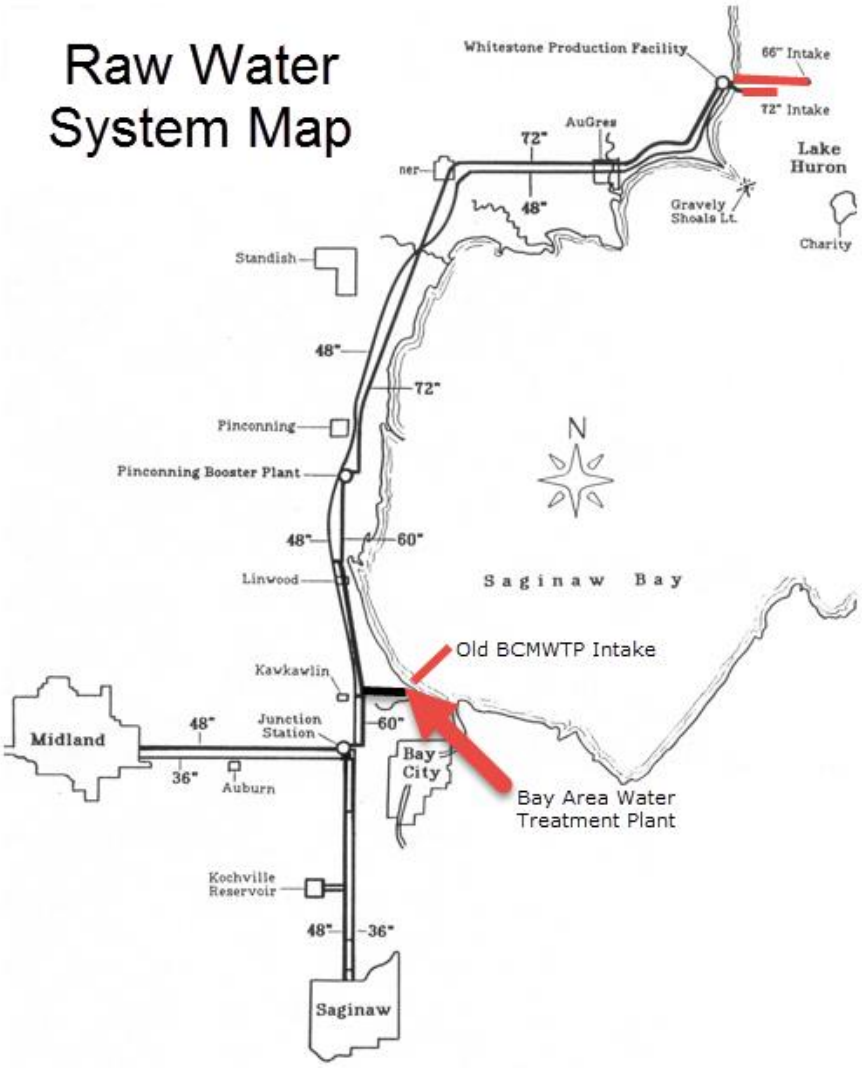
The source of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick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

View from Whitestone Point

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 byproducts 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.

Source Water Assessment



The inner Saginaw Bay was the source of the drinking water treated by the former Bay City Municipal Water Treatment Plant (BCMWTP). The 4-foot diameter intake pipe was located nearly 4 miles off shore.

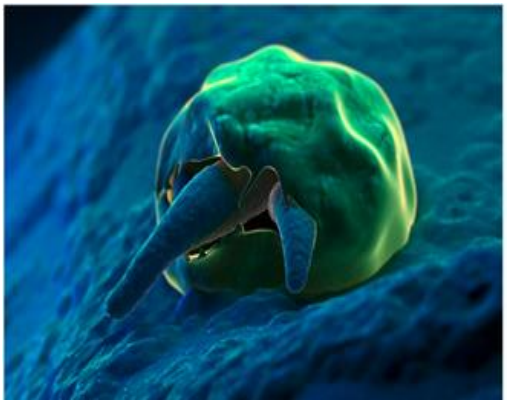
Alternately, the new Bay Area Water Treatment Plant (BAWTP) purchases raw water from the Saginaw-Midland Municipal Water Supply Corporation (jointly owned by the Cities of Saginaw and Midland). Raw water travels approximately 50 miles to the Bay Area Water Treatment Plant for processing. The intake is near Whitestone Point, a location selected in the 1940s after an engineering study showed that water at this location was typical of deep Lake Huron currents and relatively free from influences from Saginaw Bay and nearby on-shore sources of contamination.

The MDEQ previously completed Source Water Assessments of all 59 public water supplies in Michigan that draw drinking water from surface water sources such as rivers, lakes, and impoundments. The State used a seven-tiered rating scale from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The MDEQ rated the former BCMWTP source water, the Saginaw Bay, as being **Highly Sensitive and Highly Susceptible to potential contaminants**. Alternately, the MDEQ's Source Water Assessment report determined that the susceptibility of the new Saginaw-Midland source raw water was rated "**Moderately Low**." This rating is the best a surface water source can achieve. This change in rating is a major benefit and the foundation of the new Bay Area Water Treatment Plant.

Persons interested in viewing the BCMWTP source water assessment report may call (989) 894-8340 to make arrangements. Anyone interested in seeing the source water assessment for water being used at the new BAWTP can call the plant at (989) 439-7245. Additional information about the MDEQ Source Water Assessment program can be viewed on the internet at http://www.michigan.gov/deq/ . Follow the link to Water, then to Drinking Water, and finally to Source Water Assessment.

Long Term 2 Enhanced Surface Water Treatment Rule (LT2)

The purpose of the LT2 rule is to reduce illness linked with the contaminant Cryptosporidium and other pathogenic organisms in drinking water. This rule was established in part due to the 1993 Cryptosporidium outbreak in Wisconsin which caused over 400,000 cases of illnesses. Under the rule, systems monitor their raw water source for Cryptosporidium. Then, based on these results, plants must ensure that their level of treatment can remove or destroy Cryptosporidium.



Cryptosporidium

What is Cryptosporidium?

Cryptosporidium is a microbial pathogen which can cause illness and is highly resistant to chlorine and other disinfectants. Consuming water with Cryptosporidium can cause gastrointestinal illness, which may be severe and sometimes fatal.

LT2 Results

In October 2015, the Bay Area Water Treatment Plant began conducting monthly source water sampling for Cryptosporidium and Giardia. Due to the new high quality source water, neither were detected. Even if our source water was shown to have Cryptosporidium in it, the pore size of our membrane filters are small enough to filter it out, practically eliminating the chance that Cryptosporidium could get through the treatment process and out into the distribution system.

Water Contaminants

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. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. 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 public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800) 426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised 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/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Water Drinking Hotline (800) 426-4791.

Water Quality Data Tables

The data presented in the upcoming tables are from testing done in 2015, unless otherwise noted. In the first table you will find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided the definitions below.

Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
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.
LRAA	Locational Running Annual Average	The average of sample results taken at a particular monitoring location during the previous four calendar quarters.
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. MCLGs allow for a margin of safety.
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.
NA	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	A measurement of the lack of clarity in water, or cloudiness of the water.
PPB	Parts Per Billion (one in one billion)	The PPB is equivalent to micrograms per liter, or ug/L . A microgram = 1/1000 milligram.
PPM	Parts Per Million (one in one million)	The PPM is equivalent to milligrams per liter, or mg/L. 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, dibromochloromethane and bromoform. Compliance is based on total.

Results from Combined Plant Tap						
Contaminants	**MCLG or MRDLG**	**MCL, TT, or MRDL**	**Average**	**Range**	**Violation**	**Typical Source**
Inorganic Contaminants						
Fluoride (ppm)	4	4	.77	.61-.91	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate (ppm)	10	10	.5	ND-1.00	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Sodium (ppm)	NA	NA	11	8-15	No	Erosion of natural deposits; Leaching.
Barium (ppm)	2	2	.02	.02	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Volatile Organic Contaminants						
Xylenes (ppm)	10	10	.0002	ND-.0006	No	Discharge from petroleum factories; Discharge from chemical factories.
Total Organic Carbon (% Removal) Bay City Municipal Water Treatment Plant Tap (1/1/15-8/31/15)						
TOC	NA	TT	33% removal	29%-35.1% removal	None	Naturally present in the environment.

Results from Bay Area Water Treatment Plant Tap (August 31, 2015-December 31, 2015)			
Substances Not Regulated At the Tap			
Test run	**Average**	**Range**	**Definition of Substance**
pH	7.9	7.6-8.6	A measure of acidity and alkalinity.
Hardness (as CaCO3) (ppm)	100	82-114	A measure of the total concentration of calcium and magnesium ions.
Alkalinity (as CaCO3) (ppm)	81	76-92	A measure of the capacity of water to neutralize an acid.
Calcium (as CaCO3) (ppm)	84	68-106	Inorganic substances often found in water.
Sulfates (ppm)	15	5-22	
Chloride (ppm)	10.5	10-11	

Undetected Contaminants

The following contaminants were monitored at the Bay Area Water Treatment Plant between August 31, 2015-December 31, 2015 and were not detected in the water leaving the plant. Although it isn't a requirement to include this information in our report, we chose to include it to show all the substances we test for that were **NOT** found in your water.

1,1 Dichloroethane
1,1 Dichloropropene
1,1,1,2 Tetrachloroethane
1,1,1-Trichloroethane
1,1,2,2 Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethylene
1,2,3 Trichlorobenzene
1,2,3 Trichloropropane
1,2,4 Trimethylbenzene
1,2,4-Trichlorobenzene
1,2 Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3 Dichlorobenzene
1,3 Dichloropropane
1,3,5 Trimethylbenzene
1,4 Dichlorobenzene
2,2 Dichloropropane
2,4,5-T
2,4,5-TP (Silvex)
2,4-D
3 Hydroxycarbofuran
4,4'-DDD
4,4'-DDE
4,4'-DDT
Acetochlor
Acifluorfen
Alachlor
Aldicarb
Aldicarb sulfone
Aldicarb sulfoxide
Aldrin
Alpha emitters
Antimony
Arsenic
Atrazine
Bentazon
Benzene
Beryllium
Bromoacetic acid
Bromobenzene
Bromochloromethane
Bromoform
Bromomethane
Cadmium
Carbaryl
Carbofuran
Carbon Tetrachloride
Chlordane
Chloroacetic acid
Chlorobenzene (monochlorobenzene)
Chloroethane
Chloromethane
Chromium
cis-1,2-Dichloroethylene
Cis-1,3 Dichloropropene
Cyanide
Dalapon
Dibromoacetic acid
Dibromomethane
Dicamba
Dichlorodifluoromethane
Dichloromethane
Dieldrin
Dinoseb
Endrin
Endrin aldehyde
Ethylbenzene
Fluorotrichloromethane
Gamma-Chlordane
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclohexane (alpha-BHC)
Hexachlorocyclohexane (beta-BHC)
Hexachlorocyclohexane (delta-BHC)
Hexachlorocyclopentadiene
Iron
Isopropylbenzene
Lead
Lindane
Mercury
Methiocarb
Methomyl
Methoxychlor
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl-tert-butyl ether (MTBE)
Metolachlor
Metribuzin
Molinate
Napthalene
n-Butylbenzene
Nickel
Nitrite [measured as Nitrogen]
n-Propylbenzene
o-Chlorotoluene
Oxamyl [Vydate]
o-Xylene
PCBs [Polychlorinated biphenyls]
p-Chlorotoluene
Pentachlorophenol
Picloram
p-Isopropyltoluene
Polybrominated biphenyls
Propoxur
Radium (combined 226/228)
sec-Butylbenzene
Selenium
Simazine
Styrene
tert-Butylbenzene
Tetrachloroethylene
Tetrahydrofuran
Thallium
Toluene
Total DCPA degradates, mono- and di-acid
Toxaphene
trans-1,2-Dichloroethylene
Trans-1,3 Dichloropropene
Trichloroethylene
Vinyl Chloride

Microbiological Contaminants

Water in the plant tap and distribution system is regularly tested for Total Coliforms and E coli. Total Coliforms are an indicator bacteria; by detecting their presence, it indicates that there are probably also pathogens, which are disease causing bacteria, in the water. Pathogens can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. E. coli is a disease causing coliform that normally inhabits the intestines of humans or warm blooded animals. Water with coliform contamination may pose a special health risk for infants, young children, and people with severely compromised immune systems.

Finished water leaving both plants was tested daily in 2015 for Total Coliforms and E. coli. None of these samples tested positive because coliforms in the raw water are removed or destroyed through filtration and chlorination. Although water leaving the plant has been shown to be coliform free, our goal is that water remains coliform free throughout the distribution system and at your tap. The way to accomplish this is to ensure that free chlorine, a disinfectant, is found throughout the system. Below is a chart of the range of chlorine found in the system, along with the highest Running Annual Average, calculated quarterly, throughout the year.

Chlorine Levels Detected In The Distribution System						
Substance	**MRDLG**	**MRDL**	**Highest RAA**	**Range**	**Violation**	**Typical Source**
Free Chlorine (as Cl2) (PPM)	4	4	0.91	0.00-2.11	No	Water additive used to control microbes.

Regulations require that not more than 5% of the samples collected from our distribution system each month show the presence of Total Coliform. System-wide, 2,284 bacteriological samples were collected from the distribution system in 2015, and 2 samples were tested positive for Total Coliform. Immediate retesting results were negative so there was no violation. None of the 2,284 samples tested positive for E coli. The table below shows "worst case" monthly totals for the period from Jan. 1st 2015 to Dec. 31st 2015.

Total Coliform Sampling from Distribution System						
Contaminant	**MCLG**	**MCL**	**Highest MCL**		**Violation**	**Typical Source**
Total Coliform (% positive samples per month)	0	5% per month	0.56 %	NA	No	Naturally present in the environment.

% positive samples/month: Percent of samples taken monthly that were positive

Disinfection versus Disinfection By-Products Rule

Total Trihalomethanes (TTHM)

The Bay Area Water Treatment Plant uses chlorine as its disinfectant as did the former Bay City Municipal Water Treatment Plant. Chlorination has made the U.S. water supply safe from illness produced by bacteria, viruses and parasites. Fortunately, chlorine disinfection has almost completely eliminated risks of deadly waterborne diseases such as typhoid fever, cholera, and dysentery. However, the chlorination process has also produced byproducts. These disinfection byproducts include a group of chemicals known as Total Trihalomethanes (TTHMs). TTHMs include four chemicals: chloroform, bromodichloromethane, dibromochloromethane, and bromoform. The U.S. Environmental Protection Agency (EPA) has mandated public water systems check for TTHMs calculated on a running 12 month average. The level of TTHMs in the water should be less than 80 parts per billion (ppb). Over the past few decades, the EPA has not only lowered the level of allowable TTHMs in drinking water, but also in many cases required water systems to collect more samples than they previously did. These changes were derived from the Disinfection Byproduct Rule (DBPR).

Because the EPA has tightened restrictions on TTHMs in drinking water, many communities in Michigan that did not previously have a problem meeting the old standard now find themselves in violation of the newer standard. This violation requires that the communities both notify the public that the level of TTHMs in their water exceeds the newer level and take steps to lower the TTHMs in the water.

EPA has set standards for TTHMs in water because there is a slight possibility of an increased risk of bladder or colorectal cancer over a lifetime of drinking water with TTHMs above 80 parts per billion. Some people who drink water containing total 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. The EPA estimates drinking 2 liters of water containing 100 ppb TTHMs every day for 70 years could result in 3 extra cases of cancer for every 10,000 people. The slight risk of increased cancer occurs only after decades of drinking water with elevated TTHMs.

While TTHMs do not pose a high health risk compared to waterborne diseases, they are still an important and challenging water quality issue faced by public water supply systems. Beaver Road Association, Beaver Township, the City of Pinconning, and Portsmouth Township all had total trihalomethane exceedances for 2015. All of these entities have been brought back into compliance due to the high quality of water now being produced by the new Bay Area WTP and revised distribution maintenance procedures. Beaver Road Association and Beaver Township were brought back into compliance in the 4th quarter of the monitoring period. Portsmouth Township was brought back into compliance in the 3rd quarter. Early testing in the 1st quarter monitoring period of 2016 resulted in the City of Pinconning also meeting compliance with the monitoring requirements. Continuation of compliance is expected in future testing. The chart shown in this section depicts the highest locational running annual average (LRAA), along with the lowest and highest individual sample results from 2015. It is possible to have an LRAA higher than the individual high reading, as LRAAs are calculated by averaging the previous 4 testing results together. Due to a high result in 2014, the Beaver Road Association's LRAA is higher than any individual sample collected in 2015.

Citizens have the right to know about the quality of their drinking water. They should not only be aware of problems that may cause a concern for an immediate health problem, such as E. coli, but also of those problems that are a concern over many decades.

Total Trihalomethane & Haloacetic Acid Test Results

Results from Bay Area Water Treatment Plant Tap (August 31, 2015-December 31, 2015)		
Test run	**Average**	**Range**
Total Trihalomethanes (ppb)	31	23-47
Total Haloacetic Acids (five) (ppb)	14	10-21

	Akron	Bangor	Bangor Monitor	City of Bay City	Bay County	Beaver Rd. Assoc.	Beaver Twp.	City of Essexville	Fraser Twp.	Hampton Twp.	Kawkawlin Metro	Kawkawlin	Merritt Twp.	Monitor Twp.	City of Pinconning	Pinconning Twp.	Portsmouth Twp.	Williams Twp.	Wisner Twp.
Highest TTHM LRAA	**NA**	**68**	**64**	**56**	**69**	**99(a)**	**85 (b)**	**76**	**69**	**78**	**59**	**74**	**76**	**45**	**90 (c)**	**78**	**90 (d)**	**72**	**NA**
Low	55	32	25	29	55	37	29	38	51	46	44	50	51	28	51	58	54	52	54
High	55	104	93	77	90	97	90	140	78	130	82	77	97	57	129	93	89	84	84
Monitoring Violation?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MCL Violation?	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	Yes	No	No
Highest HAA5 LRAA	**NA**	**21**	**26**	**19**	**19**	**21**	**22**	**27**	**26**	**29**	**15**	**21**	**19**	**33**	**22**	**27**	**20**	**26**	**NA**
Low	1	5	14	10	15	15	11	11	17	15	6	13	14	16	12	16	16	13	3
High	1	28	31	25	24	27	24	49	30	47	23	31	18	25	34	27	23	27	30
Monitoring Violation?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MCL Violation?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

TTHM MCL 80 ppb HAA5 MCL = 60 ppb

a. Beaver Road Association Exceeded the MCL for TTHM in the 1st 2nd and 3th quarter of 2015. In the 4th quarter Beaver Road Association came back into compliance and no longer exceeded the MCL. If you have any questions please contact Bay County DWS at 989 684 3883

b. Beaver Township Exceeded the MCL for TTHM in the 1st 2nd and 3th quarter of 2015. In the 4th quarter Beaver Township came back into compliance and no longer exceeded the MCL. If you have any questions please contact Bay County DWS at 989 684 3883

c. City of Pinconning Exceeded the MCL for TTHM in the 2nd 3rd and 4th quarter of 2015. In the 1st quarter of 2016 the City of Pinconning came out of violation and back into compliance. If you have any questions please contact the City of Pinconning at 989 879 2360

d. Portsmouth Township Exceeded the MCL for TTHM in the 1st and 2nd quarter of 2015. In the 3rd quarter Portsmouth Township came back into compliance. If you have any questions please contact Bay County DWS at 989 684 3883

Organic Matter

We know that chlorine reacts with organic matter in water and can form disinfection by-products. Decaying plant material is an example of organic matter. Generally, higher concentrations of organic matter in water equates to higher elevations of total trihalomethanes and haloacetic acids once chlorine is introduced. High chlorine concentration in the water combined with long contact time also forms a stronger reaction with the organic matter. We are required to test for these disinfection by-products at the farthest outlying reaches of the distribution system, representing the longest contact time for the organic matter to react with the chlorinated water.

Total Organic Carbon (TOC)

Total Organic Carbon testing is a speedy and convenient method of determining the degree of the organic concentration in water. The chart below depicts the major improvement in raw water quality from the former Saginaw Bay source to our new Lake Huron source. As you can see by this chart, our average total organic carbon concentrations in the Lake Huron **raw water** source being received at the new Bay Area Water Treatment Plant are lower than the average total organic carbon concentrations in the **treated water** leaving the former Bay City Municipal Water Treatment Plant sent to distribution.

Total Organic Carbon Results Comparison between Bay City Municipal Water Treatment Plant (BCMWTP) and new Bay Area Water Treatment Plant (BAWTP)					
BCMWTP testing from 1/1/15-8/31/15. BAWTP testing from 8/31/15-12/31/15. Results in ppm.					
	Average	**Range**		**Average**	**Range**
BCMWTP- Raw Water Source	3.08	2.45-4.12	BCMWTP-Treated Water	2.07	1.74-2.69
BAWTP- Raw Water Source	1.58 (a)	1.37-1.85	BAWTP- Treated Water	1.36 (b)	1.23-1.58

a. 51% AVERAGE TOC REDUCTION IN NEW RAW WATER SOURCE

b. 66% AVERAGE TOC REDUCTION IN NEW FINISHED WATER SOURCE

Plant Membrane Cartridge

How is the new Bay Area Water Treatment Plant Microfiltration System helping with Trihalomethane Formations?

Our new microfiltration system is second to none in removing turbidity from our Lake Huron raw water source. **Turbidity** is defined as the cloudiness or haziness of water by individual particles that are generally invisible to the naked eye, similar to the smell of smoke in the air. The measurement of turbidity is a key test of water quality. We monitor it because it is a good indicator of the effectiveness of our filtration system. It is required that at least 95% of our samples in one month cannot exceed 0.3 NTU. In 2015, 100% met this requirement, indicating full compliance with turbidity standards. Nephelometric Turbidity Units (NTU) are defined as the measurement of the lack of clarity in water. The higher this number is, the cloudier the water will appear. The average NTU for the former Bay City Municipal Water Treatment Plant averaged a 0.07 NTU while the new Bay Area Water Treatment Plant averaged a 0.01 NTU, resulting in a 700% reduction in turbidity.

Turbidity readings sampled from filtered water confluence						
Turbidity	**MRDLG**	**TT**	**Average**	**Range**	**Violation**	**Typical Source**
BCMWTP 1/1/15-8/31/15	none	(a)	.07 NTU	0.04 - 0.15 NTU	None	Soil runoff; suspended matter in surface water.
BAWTP 8/31/15-12/31/15	none	(a)	.01 NTU	0.01 - 0.26* NTU	None	Soil runoff; suspended matter in surface water.

a. The treatment technique requires that all samples be below 1 NTU 100% of the time and below 0.3 NTU 95% of the time in a month. 100 % of samples in 2015 were below 0.3 NTU.

* Plant Start Up

We know that turbidity also reacts with and reduces chlorine residuals in our drinking water. Since our new microfiltration system results in a major reduction in turbidity, less chlorine is needed to maintain a chlorine residual in the distribution system. Less chlorine in the finished water equates to lower formation of disinfection by-products such as Trihalomethanes and Haloacetic Acids.

Lead & Copper

There has been a lot of discussions in the news lately regarding lead contamination of drinking water. The lead concentrations leaving the Bay Area WTP and the Bay City Municipal Water Treatment Plant are non-detectible. Lead and Copper testing is performed under the regulations of the 1994 Federal "Lead and Copper Rules" (LCR). Based on population served, a required number of samples are analyzed. For the year 2015 "72" samples were taken and analyzed at an EPA approved laboratory. The LCR requires 90% of the samples must have levels less than 15 ppb of lead and less than1300 ppb of copper. We are pleased to report that only one of the 72 samples exceeded the action level of 15 ppb for lead and no samples exceeded the action level of 1300 ppb copper.

As long as there are lead services and lead containing fixtures in our water system, there will be traces of lead detected during testing. We expect the State of Michigan to reduce the action levels of lead in drinking water, and we support any new requirements that will strive to eliminate lead from drinking water. If you have a lead service line, or you are not sure whether or not you have a lead service line, you should contact your city or township to discuss having the line replaced with a non-lead service. Also, removing any faucets or lead containing plumbing in your residence is critical to the elimination of lead in your drinking water. A chart of the 2015 Lead and Copper sampling results is listed below for your review.

Lead & Copper Monitoring (Sampled in the distribution system at individual taps)

Parameter	Units	Action Level (AL)	90th Percentile Value	Exceeds Action Level?	Violation	Possible Sources
Lead	PPB	15	4	**No**	**NONE**	Corrosion of household plumbing systems.
Copper	PPB	1300	170	**No**	**NONE**	Corrosion of household plumbing systems.

Where do we test for Lead & Copper?

The EPA has assembled a series of "tiers" for lead and copper sampling sites. The chart below depicts the three different tiers and what each tier represents. All of our samples for lead and copper were taken from "Tier One" sites, representing the worse possible scenario for lead and copper contamination. Also, at least half of the required number of samples are taken from residences with lead service lines. As you can see, our mission is to seek out areas of the distribution system which represent the highest level of lead exposure. The water being sampled for lead and copper monitoring must "rest" in residential plumbing for at least 6 hours, then a sample is drawn from the faucet without any flushing. The sample represents maximum contact time with the test water and the service line and faucet. A one liter sample is required.

	Sample Category	
Tier 1 Sites	1	Single family residence with lead service line.
	2	Single family residence with lead solder copper piping constructed after 1982.
	3	Single family residence with lead plumbing.
	4	Multiple family residence (MFR) with either lead service line, lead solder copper piping constructed after 1982, or lead plumbing (when MFR comprise at least 20 percent of the total service connections).
Tier 2 Sites	5	Buildings with lead service lines, lead solder copper piping constructed after 1982, or lead plumbing.
Tier 3 Sites	6	Single family residence with lead solder copper piping constructed before 1983.

Information on Lead and Copper

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 Bay Area Water System is responsible for providing high quality drinking water, but cannot control the variety of materials used in private plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure 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 at a commercial laboratory. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800-426-4791) or at http://**www.epa.gov/safewater/lead**.

The Third Unregulated Contaminant Monitoring Rule (UCMR 3)

Once every five years, the U.S. Environmental Protection Agency (EPA) issues a new list of up to 30 unregulated contaminants to be monitored by public water systems. The EPA then randomly selects water systems throughout the country and requires them to sample for these contaminants. This monitoring provides the EPA and other interested parties with scientifically valid data on the occurrence of contaminants in drinking water. Information collected through the monitoring of these contaminants/chemicals will help to ensure that future decisions on drinking water standards are based on sound science. Listed here are the substances detected in the water systems that were required to be sampled. Results from 2014 are also included as some results were not reported at the time the 2014 Consumer Confidence Report was issued.

Bangor Twp. 2014 Sampling	**Distribution Entry Point**		**Distribution System Max Residence**	
Substance	**Average**	**Range**	**Average**	**Range**
chlorate (ppb)	15	ND-61	ND	ND
chromium (total chromium) (ppb)	.37	.27-.58	.22	ND-.43
chromium-6 (hexavalent chromium) (ppb)	.21	.18-.27	.11	ND-.18
molybdenum (ppb)	.30	ND-1.2	ND	ND
strontium (ppb)	106	94.9-116	97.3	88-105
vanadium (ppb)	.56	ND-.97	.35	.24-.63

Monitor Twp. 2014 Sampling	**Distribution Entry Point**		**Distribution System Max Residence**	
Substance	**Average**	**Range**	**Average**	**Range**
4-androstene-3,17-dione (ppb)	.00021	ND-.00042	NA	NA

Portsmouth Twp. 2014 Sampling	**Distribution Entry Point**		**Distribution System Max Residence**	
Substance	**Average**	**Range**	**Average**	**Range**
chromium (total chromium) (ppb)	.23175	.20-.247	.425	.372-.5
chromium-6 (hexavalent chromium) (ppb)	.166	.12-.207	.167	.136-.2
strontium (ppb)	106.348	89-141.873	101.276	87-107.349
vanadium (ppb)	.533	.243-.9	.931	.631-1.6
manganese (ppb)	1.021	ND-1.672	29.239	15.712-39
molybdenum (ppb)	.29	ND-1.159	ND	ND
1,4-dioxane (ppb)	.0387	ND-.15479	NA	NA

Hampton Twp. 2014 Sampling	Distribution Entry Point		Distribution System Max Residence	
Substance	**Average**	**Range**	**Average**	**Range**
chromium (total chromium) (ppb)	.06	ND-.24	.108	ND-.223
chromium-6 (hexavalent chromium) (ppb)	.131	.089-.17	.145	.116-.179
HCFC-22 (ppb)	.079	ND-.314	NA	NA
manganese (ppb)	1.892	1.141-2.433	.456	ND-1.823
strontium (ppb)	98.286	88.877-114.199	112.997	95.395-126.36
vanadium (ppb)	.333	.24-.777	.396	.346-.684

Bay City 2015 Sampling	Plant Tap		Distribution System Max Residence	
Substance	**Average**	**Range**	**Average**	**Range**
chromium (total chromium) (ppb)	.16	ND-.25	.18	ND-.31
chromium-6 (hexavalent chromium) (ppb)	.17	.15-.18	.17	.14-.19
strontium (ppb)	95	86-100	101	95-110
vanadium (ppb)	.57	ND-1.5	.53	ND-1.2

Kawkawlin Twp. 2015 Sampling*	Distribution Entry Point		Distribution System Max Residence	
Substance	**Average**	**Range**	**Average**	**Range**
chromium (total chromium) (ppb)	.172	ND-.343	.308	.291-.325
chromium-6 (hexavalent chromium) (ppb)	.217	.175-.258	.208	.183-.233
strontium (ppb)	108.46	94.632-122.288	104.448	98.836-110.06
vanadium (ppb)	.554	ND-1.108	.635	.37-.899

*Results listed for Kawkawlin Township are from the first half of 2015. Results from sampling done in the second half of 2015 were not yet available to include in this CCR. As soon as we receive the results, we will make them available to you.

Opportunities for Public Participation

We believe that informed and involved citizens can be strong allies of water systems as they take action on pressing problems. The table below lists the meeting dates and locations where your elected officials may discuss water system issues.

Water Supplier	Board Meeting Monthly Schedule	Time	Location of Meeting
City of Bay City	1st & 3rd Monday	7:30 pm	City Hall, 301 Washington Ave.
City of Essexville	2nd Tuesday	7:00 pm	City Hall, 1107 Woodside
City of Pinconning	3rd Monday	6:00 pm	City Hall, 208 Manitou
Bay County Road Comm/DWS	2rd Wednesday (typically)	9:00 am	Road Commission, 2600 E. Beaver Rd.
Bangor Twp.	2nd Tuesday	7:00 pm	Township Admin. Office, 180 State Park Dr.
Beaver Twp.	2nd Monday	7:00 pm	Township Hall, 1850 S. Garfield Rd.
Frankenlust Twp.	2nd Tuesday	7:00 pm	Township Hall, 2401 Delta Rd.
Fraser Twp.	2nd Monday	7:00 pm	Township Hall, 1474 N. Mackinaw
Kawkawlin Twp.	4th. Tuesday	4:00 pm	Township Administrative Bldg, 1836 E. Parish Rd
Merritt Twp.	2nd Tuesday	7:30 pm	Township Hall, 48 E. Munger Rd.
Monitor Twp.	2nd & 4th Monday	7:00 pm	Township Hall, 2483 Midland Rd.
Pinconning Twp.	2nd Tuesday	4:00 pm	Township Hall, 1751 Cody Estey Rd
Portsmouth Twp.	3rd Monday	6:00 pm	Township Hall, 1711 W. Cass Ave.
Williams Twp.	2nd Tuesday	7:00 pm	Township Hall, 1080 W. Midland Rd.
Hampton Twp.	2nd & 4th Monday	4:00 pm	Township Hall, 801 W. Center Rd.
Bangor-Monitor Assoc.	2nd Wednesday	9:00 am	Bangor-Monitor, 2523 E. Midland Rd.
Kawkawlin Metro Assoc.	1st Tuesday	7:00 pm	405 Old Beaver Road

For more information please contact:

Contact Name: Mark D. Moers, Plant Superintendent
Bay Area Water Treatment Plant
Address: 2701 N. Euclid Avenue
Bay City, MI 48706
Phone: (989)439-7245

Customer questions and comments are welcome

To receive a hard copy of this report, or to ask questions, please write, call, or send email to:

E-mail: BAWTP@baycodws.org

This entire water quality report is also available on the
Web site: www.baycodws.org/CCR2015.pdf