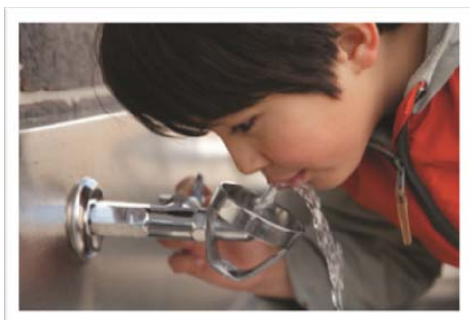
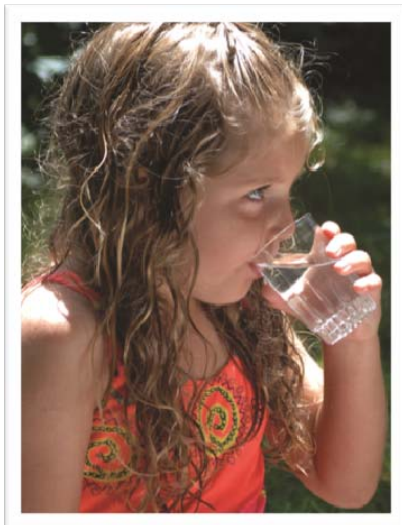


City Utilities Drinking Water We Treat It Right



Quality water for you, quality water for life!

A Guided Walk Through Fort Wayne's Drinking Water Treatment and Testing Processes

This information is compiled from a series of City Utilities bill stuffers published from February – September 2014

Have you ever wondered what City Utilities does to provide you with safe, affordable drinking water every day?

Source: Fort Wayne takes its drinking water from the St. Joseph River. When City leaders were looking for a reliable water source in the 1930s, they learned that the St. Joseph River has the most consistent flow and is the cleanest of the City's rivers. Cleaner source water means lower costs for making the water safe to drink.

River water may contain a number of different substances that must be removed, killed or deactivated in order to make it safe for drinking. Fort Wayne's water treatment process, and the testing that is done throughout the process, ensures that our customers always receive water that is safe and is as good or better than state and federal standards require.



Facilities: City Utilities constructed and operates two dams on the St. Joseph River – one at Leo-Cedarville and one near IPFW, just south of Coliseum Boulevard. The purpose of both dams is to create reservoirs where water can be held during the summer to meet the needs of the community – even in very dry years. City Utilities also owns and operates a water reservoir near Grabill, Indiana known as Hursttown. The Hursttown Reservoir holds 1.8 billion gallons of water and acts as an emergency water

supply for Fort Wayne. It also offers a location for recreational opportunities such as rowing and fishing.



Water goes from the St. Joseph River into the **Three Rivers Filtration Plant.** The Plant is located where the St. Joseph and St. Mary's Rivers meet to form the Maumee River,

just north of downtown Fort Wayne. When the building was built in the 1930's City leaders wanted the building to be a landmark that would pay tribute to the importance of safe drinking water for the growing community. The building is designed in the Collegiate Gothic style and is covered in Indiana limestone. Ornate carvings on the corners pay tribute to local wildlife and water features.



Intake: Screens on the water intake pipes ensure that trash, leaves, limbs and other large items floating in the river are not pulled into the treatment process. Pumps deliver water to the highest point in the Plant and from there, water flows by gravity through the remainder of the treatment process. The water coming into the plant is tested so that **physical and chemical treatment processes** may be properly adjusted.

Cleaning the Water: Once water is inside the Plant both chemical and physical processes are used to make the water safe to drink. The first step in the treatment process involves the addition of ferric sulfate, polymer, lime, and carbon to the raw water. The chemicals are physically mixed into the water with large paddles. In this “flocculation stage”, the ferric sulfate causes the formation of sticky clumps in the water called “floc.” Soil particles and other materials in the water stick to the floc. During flocculation, the carbon that was added earlier soaks up agricultural chemicals and helps to remove tastes and odors and lime begins to soften the water.



The floc clumps continue to grow and pick up the carbon and other suspended particles. Water flows into settling tanks where the clumps of floc are so heavy they settle to the bottom and clear water flows out from the top. This process of flocculation and settling happens two times.

Softening: The hardness of water is determined by the amount of calcium and magnesium it contains. These minerals occur naturally in river water. Early in the treatment process, City Utilities adds powdered calcium hydroxide (commonly known as lime) to the water as a softener. The lime causes a chemical reaction that changes the dissolved calcium and magnesium to an insoluble form so some can be removed during the water settling process.

The hardness of water is measured in milligrams of calcium and magnesium per liter. Very soft water may have from 0 – 75 mg/L of hardness. Hard water has between 150 and 300 mg/L. After softening, Fort Wayne’s water averages about 118 mg/L and is considered moderately soft. With moderately soft water, soaps and detergents create more suds so you can use less. Keeping water at a moderately soft level avoids some of the pipe corrosion problems that can occur with excessively soft water.

Testing to Customize Treatment: Cleaning river water to make it safe to drink is done at water filtration plants all over the country every day. The treatment techniques such as disinfection and filtration are similar from plant to plant, but the **process used must be customized depending on the source of the water being treated** and the condition of the water when it comes into the plant.

Fort Wayne’s drinking water comes from the St. Joseph River. All surface water bodies contain algae, bacteria, viruses and parasites that can make people sick if they are not properly treated or removed. These microbiological organisms may come from failing septic systems, partially treated sewage discharged into rivers, domestic animals and wildlife. Fort Wayne uses chemical and physical methods to eliminate the risks posed by these organisms.

Water from the St. Joseph River can vary from season to season and even day to day depending on many factors including the amount of rain that has fallen. When river water first enters the Three Rivers Water Filtration Plant, it is tested extensively. The hardness is tested. Tests are done to see if the water contains chemicals from agricultural runoff upstream, to find out how much sediment is suspended in the water and the amount and types of naturally occurring germs are in the water. The water temperature is recorded as is the pH – a measure of how acidic the water may be.



Based on these tests, chemists and licensed operators at the plant determine the amounts of various treatment chemicals that will be required to make the water safe. As the water moves through the stages of treatment, it is tested again and again so that processes can be continually “tweaked” to ensure the finished water meets all of the standards for quality that are set by the US Environmental Protection Agency and the Indiana Department of Environmental Management.

Either during or at the end of the treatment, Fort Wayne’s water is tested more for more than 120 different substances including: lead, copper and iron; bacteria and pathogens; nutrients such as phosphorus and ammonia; industrial compounds; agricultural chemicals; and turbidity (clarity). We even test the water for taste although this is a more subjective measurement.

Disinfection: In the past, City Utilities has used chlorine dioxide as the first line of defense in disinfecting water. Chlorine dioxide is a mixture of sodium chlorite and chlorine. In December 2013 and January 2014, City Utilities began a transition to use of the chlorine alone for water disinfection. Using free chlorine did cause a change in the taste and odor of our water for a few days and some customers called to report a stronger than normal chlorine taste and odor or a slight metallic taste. Some people are more sensitive to changes in taste and odor of water, and sometimes the difference is more noticeable in hot water.

As part of the implementation of an ultraviolet (UV) disinfection system, (more information below), City Utilities has switched primarily to the use of free chlorine for chemical disinfection. Changing the chemicals used for disinfection does NOT impact the safety of the water, in fact it adds more protection when used in conjunction with UV. To manage the changes in taste and odor, City Utilities may add sodium chlorite back into the process from time to time. The use of ultraviolet light itself as part of the disinfection process does not affect the way water tastes.

Again and again over time, studies have shown that using chlorine for drinking water disinfection is safe and effective when chlorine levels are carefully controlled. City Utilities tests water throughout the treatment process and from many taps in the community to ensure that we use the lowest amount of chlorine possible to achieve the required level of disinfection. Much more information about drinking water contaminants and treatment methods may be found at <http://water.epa.gov/drink/info/>.

Filtration: Water also goes through filters before it is sent out to customers. This is a physical treatment process using filters

made of sand. The filters work in two ways: first, some microorganisms and suspended particles are large enough to be trapped in the tiny pockets between the grains of sand. Second, the grains of sand act like magnets. Naturally occurring electrical charges in the water and sand particles cause some microorganisms to be removed from the



water by sticking to the sand. The sand is cleaned regularly to remove organisms that become trapped in it.

Deactivation of Pathogens Using Ultraviolet Light: In the fall of 2013, Fort Wayne City Utilities completed the addition of a new technology for treating drinking water at the Three Rivers Water Filtration Plant. Because of new federal regulations, an ultraviolet (UV) disinfection system was put in place as an additional measure of control primarily to address a pathogen called *Cryptosporidium*. Awareness of *Cryptosporidium* and the illness it can cause increased after an outbreak of illness was traced to drinking water in Milwaukee in 1993.

In Fort Wayne, traditional disinfection using a form of chlorine plus filtration has always been effective for removing contaminants from river water to make it safe for drinking. Chlorination in the drinking water treatment process kills many of the bacteria that could make people sick such as fecal coliform and *e.coli*. In fact, treatment of drinking water to reduce infectious diseases is cited as one of the top 10 achievements in public health in the 20th century. The new UV disinfection system, representing a \$22 million investment, provides an increased level of health protection.

While water treatment with chlorine does not kill pathogens such as *Crypto*, filtration has been the reliable method to remove this pathogen. When the Environmental Protection Agency added a requirement for additional steps to deactivate pathogens, City Utilities investigated several options to meet new requirement including UV, filtration using membranes, and ozonation. Ultimately UV was selected because of its compatibility with our existing treatment system, and it was found to be the most cost effective.



Keeping Water Clean from Plant to Tap: Fort Wayne City Utilities employees work hard all day every day to ensure that the drinking water leaving the Three Rivers Water Filtration Plant meets all federal and state regulations for water safety and quality. We are also required to make sure that the water reaching your tap contains a “disinfection residual” so that bacteria cannot grow in the water after it leaves the Plant.

Fort Wayne uses a compound called “chloramine” to maintain the disinfection residual. Creating chloramine involves adding ammonia to the water before it leaves the plant and after it has been treated with chlorine. Chloramine is formed and remains in the water to keep it safe when it reaches your home. Creating chloramine stabilizes the disinfection process. Also water treated with chloramine is less likely to have the distinct chlorine smell associated with the application of chlorine alone. A number of other Indiana cities use chloramine.

The U. S. Environmental Protection Agency (US EPA) has regulations that limit the concentration of chloramine in drinking water to 4 parts per million. Generally, the end of pipe chloramine level should

be greater than 0.5 parts per million (ppm) in 95% of samples taken in a two month period. Fort Wayne samples a number of sites every weekday to monitor the amount of disinfectant in the water pipeline system to ensure that our water meets federal guidelines. The average concentration was 1.01ppm in 2013.

Water Distribution and Delivery: City Utilities uses a series of pumps at the Filtration Plant to send water out into the water distribution system at high pressure. Once water leaves the plant, pressure in the system is maintained by using elevated storage tanks, pump stations and 1,177 miles of water mains to deliver water to you. All the parts in the distribution system must work together to provide adequate water flow and pressure to you for everything from fire-fighting to cooking, bathing, washing the car and doing laundry.

To ensure the water is there every time you turn on the tap, City Utilities is committed to replacing an average of nine miles of mains every year. This helps to ensure reliability to avoid service disruptions that may result from water main breaks.

Summary: Your drinking water is clarified to remove the tiniest particles, disinfected to kill germs, filtered and treated with ultraviolet light. The water is also softened with lime before it is sent out to you. Throughout the treatment process water is tested and the process adjusted to ensure you receive the highest quality water that meets or is better than all state and federal regulations require. We test the water again before it is pumped out to you to be sure it meets our rigorous standards for clarity and safety.

Providing you with great quality water at a reasonable cost is a clear demonstration of our commitment to you. City Utilities is also committed to providing you with information about how we treat your water, what we find when we test it and how we invest in making the water system reliable to meet your needs..

Any questions you may have about Fort Wayne's water may be directed to the 311 call center (by dialing 311) or by emailing us at info@fortwaynewater.org.