

August 2008

## City of St. Joseph Water Treatment Plant

# Water System Update

## New Water Intake Design Underway

The St. Joseph Water Treatment plant's water source is Lake Michigan. The plant's low service pumps draw lake water in through the intake pipe that is connected to specially designed inlet structures on the lake bottom. The current intake pipe, which was constructed in 1955, is no longer adequate in terms of water quality, reliability or capacity. To help better understand why a new intake will be built it is useful to think in terms of the three S's.

### **Short, Shallow and Small**

Short and shallow refer to the fact that the intake pipe is only 1,500 feet long and extends out into water that is only 18 feet deep. As such, the water drawn in from this location near shore is highly influenced by the St. Joseph River. River water differs significantly from lake water in that it carries a great deal of natural organic matter and turbidity, which can be difficult to filter and treat. Natural organic matter consists of vegetative decomposition products which are simply plants (leaves, trees, grasses) that end up in the river and are eventually carried to the lake as microscopic organic compounds. We sample and test for both turbidity and natural organic material in the form of Total Organic Carbon (TOC); please see the following pages for more information on these water quality indicators. The new intake will be influenced less by the St. Joseph River as it will be extended into deeper, higher quality lake waters.

Short and shallow also impact the reliability of our plant by exposing the intake to frazil ice and sand. During the winter, ice forms on the surface of the lake and is carried down to the intake by wave action. This type of ice is known as frazil ice and can accumulate rapidly on the intake structures. Over the past 10 years, frazil ice has blocked the St. Joseph intake seven times causing system storage to become dangerously low. During two of those events it was necessary to obtain water from the Benton Harbor plant through the permanent emergency interconnect between the Cities' systems. Sand intrusion is also a concern with an intake located as close to shore as is St. Joseph's. Studies commissioned by the Great Lakes Research Laboratory have shown that the lake bottom is in a constant state of change inside of 3,000 feet. Sand bars move and are more affected by the wind and currents than they would be in deeper water. Emergency dredging was required on the St. Joseph water plant intake when it became plugged by sand just after a storm in the spring of 2005.

Small refers to size of the intake pipe. At only 24 inches in diameter, the St. Joseph intake can convey a maximum capacity of only 16 million gallons per day. The highest usage by our customer base in the last five years was 14 million gallons per day and the historical high during the extremely dry summer of 1988 was 15.4 million gallons. The new intake will be rated up to 40 million gallons per day.

Plans for a new intake call for a pipe 42 inches in diameter, 4,500 feet in length, constructed of pre-stressed concrete to be located in 40 feet of water. On July 21, 2008, the St. Joseph City Commission approved a contract with the consulting firm of Fishbeck, Thompson, Carr & Huber for the design of the new intake. Construction of the intake will likely begin in September of 2009 and be complete by late summer of 2011.

Below: Steel Tank assembled for new Authority Water Tower located in Lincoln Charter Township. *Photo courtesy of WAI.*

## Top Them Off!

Often touted as the Lake Michigan Shoreline Water & Sewage Treatment Authority's "Twin Towers", filling each 1,000,000 gallon tank to the brim is exactly what the Authority looks forward to doing in the near future. The following provides a brief update of the work progress and the time frame required to meet the final goal of a completed water tower.

Assembly of the steel tank that tops the prominent concrete pedestal is complete at the Jericho Road site and well underway at the Miners Road site. Once assembled, painting crews coat the exterior at ground level before raising the tank to the top of the pedestal. A greatly anticipated event, the tank raisings are currently scheduled for the middle of August and middle of September for the Jericho Road and Miners Road tanks, respectively. In the two months that follow

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## General Information

**Contaminants and their presence in water:** Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of 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)**.

**Vulnerability of sub-populations:** 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 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 (800-426-4791).

**Sources of drinking water:** The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. Our water comes from surface water. 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 and residential uses.
- **Radioactive contaminants**, which are naturally occurring or the result of oil and gas production and mining activities.
- **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.

In order to ensure tap water is safe to drink, EPA prescribes regulations that 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 provide the same protection for public health. Many water suppliers add a disinfectant to drinking water to kill germs such as giardia and E. coli. especially after heavy rainstorms, your water system may add more disinfectant to guarantee that these germs are killed.

### Terms and abbreviations used on the facing page

**Disinfection By-Products (DBPs):** Total trihalomethanes (THMs) and haloacetic acids (HAAs) believed to be formed when chlorine and natural organic matter/total organic carbon are combined.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

**Maximum Contaminant Level (MCL):** 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.

**Natural Organic Matter (NOM):** See TOC below. Organic matter present in natural waters. Natural organic matter is broken down organic matter that comes from plants and animals in the environment. NOM is a collective term, assigned to the realm of all of this broken down organic matter. Basic structures are created from cellulose, tannin, cutin, and lignin, along with other various proteins, lipids, and sugars.

**ppb:** parts per billion or micrograms per liter ( $\mu\text{g}/\text{l}$ )

**Running Annual Average (RAA):** A running annual average (RAA) is the average of 12 consecutive monthly averages (when on monthly monitoring) or the average of 4 consecutive quarters (when on quarterly monitoring).

**Total Organic Carbon (TOC):** Also referred to as Natural organic matter, TOC consists of vegetative decomposition products such as plants (leaves, trees, grasses). TOC's have no adverse health affects.

## St. Joseph Water Treatment Plant Did Not Meet TOC Removal Requirements

One of the processes used by the Plant to ensure that your water is safe to drink is the addition of chlorine. Chlorine kills waterborne diseases, is a very effective disinfectant, is relatively inexpensive and its use is based upon well-established technology.

While chlorine is effective in controlling many microorganisms it may react with natural organics in water to form disinfection by-products (DBPs). As stated in the intake article on Page 1, we monitor natural organic material by sampling and testing for TOC or total organic carbon. In the 1<sup>st</sup> and 2<sup>nd</sup> quarters of this year, the Water Treatment Plant did not meet the required TOC removal percentage and therefore we are notifying you of this treatment technique violation. ***This is not an emergency and your drinking water did not exceed the maximum contaminant level (MCL) for any regulated contaminant as a result of the violation.*** If it had been an emergency, you would have been notified within 24 hours.

Although **TOCs have no adverse health effects** themselves, the State has regulations requiring that certain percentages of TOCs be removed during the treatment process. The required removal of TOC is calculated as a ratio between the actual TOC removal and the TOC removal requirements. Our annual average for the TOC removal ratio for the first and second quarters of 2008 was 0.88 and 0.86, respectively. The running annual average (RAA) must be 1.00 or greater to be in compliance.

Minimizing the TOCs helps reduce the DBPs, however, TOCs is only an indicator and has no harmful effects in drinking water. In fact, the St. Joseph Water Treatment Plant has always met the DBP limits since sampling began in 1976 for THMs and 1996 for HAAs. The DBP results for the 1<sup>st</sup> and 2<sup>nd</sup> quarters are shown below.

Summary of Disinfection By-Products Results				
Regulated Contaminant	MCL (ppb)	Your Water-1 <sup>st</sup> Quarter (ppb)	Your Water-2 <sup>nd</sup> Quarter (ppb)	Violation In 1 <sup>st</sup> or 2 <sup>nd</sup> Quarters
THMs	80	41	46	No
HAAs	60	42	51	No

To reiterate, **the maximum contaminant level for disinfection by-products (DBPs) was not exceeded as the result of the TOC treatment technique violation.** Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection by-products. These by-products include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these by-products in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer. There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek information from their health care providers. You do not need to boil your water or take other actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

Upon learning about this violation, City Staff took immediate action to remedy the problem. In the short term, Water Treatment Plant Staff are conducting specific tests to optimize the dose of coagulant delivered to the solids contacting clarifiers. Initial results indicate significantly improved TOC removal rates have resulted from this effort. Long term measures to correct this issue have been identified in the Drinking Water Revolving Fund (DWRP) Project Plan. These include construction of a new water intake into deeper Lake Michigan waters (where improved water quality is expected) and replacement of the solids contacting clarifiers with a flash mix process and plate settlers. Rehabilitation of the oldest bank of filters at the St. Joseph Water Treatment Plant is also included in the DWRP plan. While the short-term measures are aimed at quickly returning the water to compliance requirements, the goal of the longer term plans is to exceed the requirements.

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

We understand that much of the information provided is highly technical in nature, therefore we encourage you to call Greg Alimenti, City of St. Joseph Water Plant Superintendent / Director of Utility Services at 269-983-1240, e-mail [Alimenti@sjcity.com](mailto:Alimenti@sjcity.com) or U.S. Mail at 700 Broad Street, St. Joseph, MI 49085 with any concerns, questions or comments.



# St. Joseph CITY OF

700 Broad Street  
St. Joseph, MI 49085

The St. Joseph Water Treatment Plant was originally constructed in 1892 and has served the St. Joseph area with water drawn through the 24" diameter intake pipe installed in 1955. Treatment plant processes include screening, disinfection, settling and filtering. The treatment plant is manned 24 hours per day and your water is constantly monitored for quality. The current Water Plant personnel, listed below, have more than 140 years of collective experience at the St. Joseph Water Treatment Plant and are dedicated to providing safe and reliable drinking water to our community.

## Contact Information

### St. Joseph Water Treatment Plant Personnel

Director of Utility Services/Water Plant Superintendent:	Greg Alimenti	Email: <a href="mailto:alimenti@sjcity.com">alimenti@sjcity.com</a>
Assistant Water Plant Superintendent:	Michael O'Malley	E-mail: <a href="mailto:omalley@sjcity.com">omalley@sjcity.com</a>
Chief Plant Operator:	Bill Schadler	
Maintenance Foreman:	Dave Ostrander	
Water Plant Operators:	Bob Janke, Tom Schramm, Shawn Orlaske, Jeff Faultersack, Marc Rowland	
Water Treatment Plant Phone:	269-983-1240	

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the raising, Caldwell Tanks, Inc. crews will work quickly to install the tank roof, floor, piping, electric service, controls and site improvements. Then in early October and early December for each respective tank, the piping and tank will be sterilized, filled and tested. Conclusion of the one week filling and testing period will be the beginning of the service life of the water towers. Thereafter, Authority water customers will realize stabilized and reliable water pressures throughout the entire system while being provided ample storage for peak periods of water use.

In a time when a lack of public infrastructure investment is creating significant hardships and shortfalls in other communities throughout the country, the Authority is proud to implement a project to sustain a safe and reliable water supply which is critical to the future prosperity of the area. This important project has been designed to handle the region's water storage needs for the next 40 years.

Article contributed by Alan Smaka, P.E., Wightman and Associates, Inc.— Authority Engineer

<sup>1</sup> The Lake Michigan Shoreline Water & Sewage Treatment Authority is composed of St. Joseph Charter, Lincoln Charter, and Royalton Townships and the Villages of Shoreham & Stevensville.