

## Water Quality Improvement Strategy

### Overview

The Sault Ste. Marie Public Utilities Commission (PUC) switched from chloramine to free chlorine disinfectant in the distribution system on October 27, 2011. Since the conversion to free chlorine some customers continue to experience objectionable taste and/or odour and discoloured water (i.e. red or brown water).

PUC conducted augmented monitoring and testing of water quality for approximately three years, before and after the switch to free chlorine. In mid-2013 PUC commissioned a comprehensive study to research, investigate and recommend treatment options to address these water quality issues.

This study was recently concluded and a **preferred water quality improvement strategy (the Strategy)** has been developed to improve Sault Ste. Marie's water treatment processes in order to improve water quality for our customers. This Strategy was first communicated to PUC customers on February 3<sup>rd</sup> 2014 and is available on PUC's website at the following link: [www.smpuc.com](http://www.smpuc.com)

### Some Frequently Asked Questions & Answers on this issue:

#### **WHY DOES THE CITY'S EAST END HAVE MORE BROWN WATER EVENTS THAN THE REST OF THE CITY?**

The use of free chlorine in the city's iron and concrete pipes had the result of softening the pre-existing buildup of corrosion scale and sediments to unexpected degrees. When the system is disturbed this buildup is stirred up and discolours the water, resulting in localized red/brown water. The wells in the east end produce water that is naturally different (e.g. hardness, iron and manganese) than water from the west wells. These natural differences in the water result in more frequent brown water in the east end than the rest of the system.

#### **WHY DOES MY WATER SOMETIMES TASTE OR SMELL BAD?**

The water produced from the city's five treatment sources (four wells and Lake Superior) all have different make-ups (e.g. different mineral, organic and pH levels) which, when mixing together in the water system in the presence of chlorine (added for disinfection), can contribute to objectionable tastes and odours in some areas of the city. The Lorna Wells, being the most different, contribute the most to the potential for taste and odour issues. In addition, the taste and odour of free chlorine itself can be more easily detected by some people than other forms of chlorine used to disinfect drinking water.

#### **WHAT DOES THE PH LEVEL HAVE TO DO WITH THE WATER QUALITY?**

Sault Ste. Marie's drinking water has an extremely wide variation in pH levels. This is due to the fact that our water has five different sources. It is this variation that plays a key role in creating taste, odour and colour issues.

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## **HOW LONG WILL THE STRATEGY TAKE TO IMPLEMENT?**

Work will begin immediately on the water quality improvement strategy which is proposed in two stages. Completion of the entire Strategy will take approximately 4 years. The first stage will be completed by the end of 2014 with stage two finishing by end of 2017.

## **WHEN CAN I EXPECT CLEAR WATER TO COME OUT OF THE TAP?**

We are committed to improving the quality of our city's water and are confident there will be continuous improvement to the quality of drinking water starting with the first stage of the plan in 2014.

## **WHAT EXACTLY IS PUC DOING TO THE WATER TO IMPROVE IT?**

Our first step in improving the water quality will be to remove the Lorna Wells from day-to-day service. The composition of the water from this well site is one of the main contributors to taste, odour and colour problems. We are then implementing new advanced treatment methods that will harmonize the pH levels and improve corrosion control in the distribution system, thereby improving taste, odour and colour.

With Lorna being removed from service we will be adding more production capacity. It is anticipated that additional capacity can be obtained by constructing a second well at both the Shannon and Steelton well sites and by increasing the capacity of the existing water treatment plant.

Should water quality issues persist after the first stage, we will implement the second stage of the Strategy. This stage involves implementing a new UV (ultraviolet) disinfection system to provide primary disinfection and using chloramine as the secondary disinfectant which should provide incremental improvement for taste and odour.

## **WHAT IS UV DISINFECTION AND HOW DOES IT AFFECT MY WATER?**

UV (ultraviolet) disinfection is a purely physical, chemical-free process for rapidly treating well water and surface water (lakes and rivers). UV disinfection leaves no after-taste, chemicals or residues in the treated water.

## **WHAT EXACTLY IS PUC ADDING TO THE WATER?**

The recommended advanced treatment methods involve incorporating soda ash (sodium carbonate) and carbon dioxide into the treatment process to adjust and harmonize pH levels across the entire system. Soda ash is very similar to everyday baking soda and is a common food additive, used in many foods such as chocolate milk, baked goods, beer and wine. Carbon dioxide (CO<sub>2</sub>) is used in carbonated beverages.

Also, a corrosion inhibitor, blended phosphates, will be added in order to reduce the amount of lead in the water at the customer's tap. Phosphates are another class of food additives that are also added to many familiar foods, including cereals, coffee and tea, flour, coconut milk and many more.

Soda ash, phosphates and carbon dioxide are commonly added to drinking water by water utilities throughout North America and Europe. While they impart no direct taste, odour or colour to drinking water, adding them at very low concentrations can help improve all of these things – and help reduce lead at the tap.

Once the levels have stabilized we will see a marked improvement in the colour, taste and odour of our city's water quality.

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## **WHY DOES THIS STRATEGY INVOLVE TWO STAGES?**

There is a strong possibility that, once the Lorna Wells are taken out of service and the advanced water treatment processes are put in place and stabilized, we may see such an improvement that full implementation of the Strategy may not be necessary. This would mean a lower overall cost for the Strategy and therefore a smaller increase on water bills.

## **IN THE SECOND STAGE OF YOUR STRATEGY YOU ARE PLANNING TO START USING CHLORAMINE AGAIN. WHY DID WE STOP USING IT IN THE FIRST PLACE?**

In 2011 the water treatment process was changed from chloramine to chlorine (also known as free chlorine). This change was made in order to comply with changing provincial regulations. The free chlorine option was selected because it not only meant fewer chemicals added to the City's water supply but it was also the most cost effective option.

## **WAS THE SWITCH TO FREE CHLORINE A MISTAKE?**

No, at the time, transitioning to free chlorine was the most viable way to meet the changing provincial regulations regarding drinking water standards.

## **WHAT IS THE TOTAL COST OF THIS STRATEGY?**

The cost to implement the first stage of the Strategy is approximately \$2.7 million. The cost for the second stage is approximately \$4 million. The total cost to fully implement this Strategy is estimated at \$6.7 million. These are budgetary estimates that will be further refined through the detailed engineering phase.

## **HOW MUCH WILL THIS STRATEGY COST ME?**

PUC is not supported by tax money, either provincial or municipal. The new water quality strategy, if fully implemented, would mean a temporary increase of approximately \$2.70 a month or \$32.40 a year for each customer over a period of ten years.

## **WHEN WILL THE INCREASE SHOW UP?**

While work on the Water Quality Improvement Strategy has already started, costs will be phased in over the time it takes to carry out the work. It is difficult to predict exactly how and when actual costs will be incorporated into future rate increases, but we expect to see something like the following. PUC customers should not see the first water quality improvement-related increase of \$1.10 until January 2016. If the water quality still hasn't reached acceptable levels after completion of stage 1 and we do implement the second stage, water bills should increase an additional \$1.60 starting January 2018.

*It is important to remember that amounts listed here are only preliminary estimates and are subject to change. Also the actual timing of adjustments may differ.*

# WATER FACTS

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## **WILL THE INCREASE SHOW AS A SEPARATE AMOUNT ON MY BILL?**

No, the increase will be included in the overall rate.

## **DOES THE INCREASE INCLUDE SEWAGE CHARGES?**

No, the increase is only for the water part of the bill. The PUC does not set sewage fees; that is the responsibility of the City of Sault Ste. Marie. PUC only collects the money and turns it over to the City.

## **DOES THIS MEAN THE CITY COULD RUN LOW ON WATER SUPPLIES DURING THE STRATEGY?**

No. We would still have enough water to meet our needs during the entire Strategy.

## **WILL TAKING THE LORNA WELLS OUT OF SERVICE AFFECT THE WATER PRESSURE IN THE EAST END?**

No, removing the Lorna Wells from service will not have an effect on the current day-to-day water pressure anywhere in the city. Capacity upgrades will be put in place to replace the production lost from the Lorna Wells to meet flow requirements on peak demand days and for future capacity needs as our city grows.

## **WHAT IS IT ABOUT THE LORNA WELLS THAT MAKES THEM A PROBLEM?**

The water produced from the Lorna Wells, like all well water, has minerals and organics in it. While safe to drink and meeting all existing health regulations, the water from the Lorna Wells has a unique composition that causes quality issues such as brown or discolored water and objectionable odour or taste when it reacts with the chlorine treatment process.

## **HOW LONG HAVE THE LORNA WELLS BEEN A PROBLEM?**

There have been issues with the Lorna Wells since the time they were first used starting in the late 1970s. But it wasn't until the switch to free chlorine and other changes that were more recently made to satisfy new provincial regulations that the full impact of the unique composition of Lorna's water was realized.

## **IF THE PROBLEM IS THE COMPOSITION OF GROUND WATER, WHY NOT JUST USE SURFACE WATER FROM THE LAKE/RIVER?**

The main concern with switching to a single source of water for the city is that equipment failure at the water treatment plant could leave the entire city without water. Also, the costs of the upgrades that would be required to expand the water treatment plant and construct new transmission mains would be prohibitively high.

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## **IF THE BROWN WATER COMES FROM CORROSION IN THE OLDER PIPES, WHY NOT JUST REPLACE THE PIPES?**

While replacing the older pipes is an option, it's unfortunately an unrealistic one. Sault Ste. Marie's existing distribution system contains more than 470 kilometers of pipes. With about 50% made up of cast iron pipes (aged between 50 and 110 years old) the immense cost of physically replacing that much of the distribution system isn't financially feasible. Nonetheless, PUC does replace old iron water mains whenever the City reconstructs city roadways.

## **WILL THIS MEAN AN END TO FLUSHING OF THE WATER LINES?**

Flushing of the water lines is still required as part of ongoing routine maintenance to ensure continued good water quality. Flushing, in particular the uni-directional flushing that PUC has been conducting since 2012, is a recognized industry best practice in the provision of municipal drinking water and will continue indefinitely.

## **I LIVE IN THE WEST END AND HAVE NEVER HAD AN ISSUE WITH THE WATER QUALITY. WHY DO I HAVE TO PAY MORE FOR A SOLUTION TO A PROBLEM THAT DOESN'T AFFECT ME?**

There are many people in the east end that have never had a problem with the water either. However, the water quality issues experienced in the east end are not isolated to the east end. Taste, odour and colour issues occur across the entire distribution system, albeit less frequently than in the east end. The PUC is committed to providing high quality water to all of our customers. Furthermore, some of the changes being implemented under this Strategy are required not just to address the recent water quality concerns, but also to satisfy the regulations that require us to reduce the amount of lead in the water at the customer's tap. The proposed changes will benefit all customers.

## **WHERE CAN I FIND MORE INFORMATION REGARDING THIS STRATEGY?**

More information can be found on the PUC website: [www.smpuc.com](http://www.smpuc.com)