

PMPP Action Item 4 – Public Awareness Program

One of the key methods to reduce chloride discharges from the treatment plant is source reduction – keeping chlorides from entering the collection system. The purpose of the public awareness program is to inform and educate the public about what chlorides are, why chlorides are a problem, and how the public can be involved in reducing the amount chlorides discharged to the collection system.

Although the Water Utility softens the water distributed to utility customers, some residential and commercial customers choose to soften their water further. Generally, private water softeners are less efficient than the municipal system and private systems are rarely monitored and controlled by the owner. Private water softeners are most often set up to soften the entire water system, although softened water is only needed (wanted) at certain distribution points (i.e. kitchen sink tap, hot water feed, washer feed).

In 2011, the Water and Wastewater Utilities began a public education and outreach program. It is the intention of this program to educate utility customers for the long term goal of reducing chloride loading to the sewer system. During the fourth quarter of 2013, the Water and Wastewater utilities issued a joint notice to utility customers in the quarterly newsletter. In it, the WWTP addressed the problems that chlorides cause to downstream water bodies, and the water utility offered recommendations on how to assess if softening was needed, and if so, how to ensure that the softener was properly set. The water utility also offered to do onsite water testing and inspection of their softening systems. The newsletter is distributed to all utility customers served by the Water and Wastewater utilities.

A copy of the newsletter submission is included at the end of this report as Attachment 02, Newsletter Submission. The Water and Wastewater Utilities will continue working together to promote public education and outreach as it relates not only to chloride discharges, but to other parameters of concern as well (e.g. mercury, stormwater, etc).

9/24/2014 - ADDITIONAL INFORMATION HAS BEEN PROVIDED ON THIS ACTION ITEM. PLEASE SEE ATTACHMENT 04. (CAW)

proper amount of brine to be added. The brine waste is discharged to a detention tank and then pumped to the sanitary sewer system at a controlled rate.

Both underground storage tanks are sealed and water is added to the tanks when needed, being controlled by a float switch and solenoid valve to maintain a constant level in the tank.

5. Other water softening efficiency measures intended to reduce the quantity of chloride discharged to the wastewater treatment plant.

As noted previously, in 2013, new Water Utility management began softening back to previous levels (6 gpg during the period sampled). When the Water Utility made this adjustment, customers were notified in the City newsletter and on their utility bills about this change. The Water Utility is actively engaging customers to help them understand that additional softening is generally not necessary and how to increase the efficiency of their softening systems.

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Attachment 04 – Additional Information

Public Awareness Program

When evaluating the best medium to reach utility customers, the City determined that the greatest potential impact was to complete direct mailings to customers of the Water and Wastewater Utilities. Attachment 02 is the newsletter submission that was sent to the Utility's 3300+ customers. The Water Utility has completed some water quality analyses at customers home and educates customers about water softening during their daily interactions.

Wastewater staff educates individuals and groups (engineering classes from Trine University, middle school children from the local middle school, various lake property owners, etc) about chlorides and how to reduce chlorides when conducting tours of the wastewater facility and presenting at area meetings.

The local newspaper ran an article about the challenges that the WWTP has with mercury (and the WWTP's mercury variance), but has not been willing to run a similar story on chlorides. Other forms of public education and outreach (such as the City web site) have not been actively utilized at this point due limited site traffic and limited ability to modify the Wastewater Department's area on the webpage.

Water Treatment Plant Optimization

The Water Utility operates two ion exchange treatment plants. The West Mill Street Plant has been in operation since 1950 and was upgraded in 2008. The Satellite Water Plant was placed in operation in 1989. In May 2013, the Water Superintendent retired and the Assistant Superintendent was promoted. Whereas the previous superintendent was reluctant to make significant efforts to improve process efficiencies, the new superintendent immediately began targeting processes and systems that would allow the utility to operate more efficiently. As of this addendum (September 2014), the Water Utility has completed a number of minor improvements utilizing its own staff and resources. The Water Utility has also completed a significant process improvement study with a number of improvements that will increase treatment efficiencies for a number of processes, including chloride reduction.

At the West Mill Street facility, as part of the 2008 upgrade, the softening process utilized a venturi brine injection system that provided uneven brine dosing to the softeners. This resulted in using a higher concentration of brine to the softeners and more frequent softener regeneration to achieve the targeted finished water hardness. In March 2014, Water Department staff installed a dedicated brine pump and forcemain from the brine storage tank to the softeners. A throttle valve and flowmeter were also installed on this forcemain so that instantaneous dosage could be noted and adjusted to maximize efficiency. Based on established guidance and onsite analysis during multiple softening cycles, the Water Department has established refined its regeneration practices to reduce overall salt dosage and regeneration cycles.

Immediately after installing the pumped brine system, charting of the softening cycles showed that the softeners would use approximately 580 gallons of concentrated brine per cycle. During a softening cycle, a Water Operator would take grab samples of the softener after every 10,000 gallons of water that flowed through the softener. The grab samples were analyzed for hardness and the brine curve used to adjust brine feed during the softening cycle was adjusted to reduce the amount of brine used while maintaining target finished water hardness. Since implementation of this process improvement, brine usage per regeneration cycle has been reduced by 130 gallons (currently 450 gallons brine per cycle), which reduces chloride discharge to the sanitary sewer system.

Identical brine management efforts are being applied at the Satellite Water Plant. Similar improvements are anticipated, but there are currently no quantifiable results at the time of this addendum.

In 2013, the new Water Superintendent began working with two consulting engineers to address some deficiencies (physical equipment and process control) in the water treatment and distribution systems.

One of the targeted systems is the telemetry system. The current telemetry system was installed in the late 1980's and allows no control (monitoring only) of the water treatment and distribution systems. Plans are being developed to completely replace the telemetry system to allow for centralized control of the various processes that collect, treat and distribute drinking water to utility customers. Although the focus on this improvement is process control, not chloride control, improved well-to-tap efficiencies will inherently improve chloride consumption, as well.

To date, more than \$75,000 has been allocated to consultant engineers for various process improvement design and construction management; more than \$300,000 will be spent on Phase 1 of the improvement plan to install new telemetry and process control elements of the utility's capital improvement plan.

As it relates to efforts to prevent incidental releases of salt to the collection system, at least two changes have been made since the submittal of the annual report:

1. At the Satellite Water Plant, it was found that the brine pumping system was intermittently pumping at a pressure that was higher than the distribution system pressure, which occasionally allowed brine to push into the distribution system. To correct this, a check valve will be installed on the interface of the brine line to the makeup water line. Although this situation would not result in a direct discharge to the sanitary sewer system, it is recognized that any salt introduction to the water distribution system will most likely end up in the sanitary sewer system.
2. The salt storage tanks are flooded with water to create the brine that is used in the water softening process. As salt is used up, water makes up the lost volume of the salt. If the water level of the brine tank is not drawn down prior to delivery of additional salt, brine will overflow the tank and could be discharged into the sanitary sewer system. Operators are now instructed to monitor regularly scheduled salt deliveries and allow the brine tanks to draw down so that they will not overflow when salt is delivered.