

## CHLORIDE SOURCE REDUCTION

The City of Brookfield provides treatment of sanitary, cooling, and process wastewater discharged from your home or facility. However, some pollutants such as **chloride** are not removed in the wastewater treatment process and thus pass-through the plant into the environment. Therefore, the DNR has enacted regulations to reduce discharges of chloride *at their source* to prevent the harmful effects this pollutant has on the environment. Consequently, the City of Brookfield is seeking voluntary chloride use reduction activities, from all industrial, commercial, and residential sources.

### What is chloride and where does it come from?

Chloride is one component of sodium chloride (NaCl) or table salt, a naturally occurring and commonly used substance. When salt is added to water it dissolves and breaks down into sodium (Na<sup>+</sup>) and chloride (Cl<sup>-</sup>).

A major origin of chloride discharge is from residential water softeners and from commercial/industrial water softening processes. People use water softeners to remove minerals from water that cause hardness. Hard water passes through a column of sodium charged resin, where hard water ions such as calcium and magnesium are removed from the water by exchanging places with the resin bound sodium ions. After time, the resin becomes “exhausted” and must be recharged with sodium by a process known as regeneration. During this process the resin is washed with a concentrated brine solution (NaCl), the captured minerals and brine wash go down the drain and into the sewer system.

### Why is water softener salt a problem?

The Salt Institute of America estimated in 2007 Americans spent approximately \$401 million to purchase 3.5 million tons of salt for use in water softeners. The cumulative effects of each homeowner’s excess use of salt and resulting brine discharge can have negative impacts on the environment resulting in altered characteristics of the entire local ecosystem. In addition, as chloride filters down to the water table, it can stress plant respiration and change the desirability of our drinking water.

### Why can’t the wastewater treatment plant remove chlorides?

Conventional treatment plants are designed with physical and biological processes to remove solids and break down organic wastes. Dissolved chloride can not be removed by physical settling, or biologically degraded. Essentially, chloride coming in the “front door” of the wastewater plant leaves out the “back door”. Approximately 22 tons of salt pass through the City of Brookfield Wastewater Plant to the Fox River each day. Technology such as microfiltration and reverse osmosis is available to treatment plants for chloride removal, but is very expensive. To avoid the need for much costlier treatment, chloride discharges must be reduced at their source of pollution.

### What can I do to help?

Soften only the water that needs to be softened. Cold tap drinking water lines and the outside water spigots should bypass the water softener. By softening less, you will decrease the cost of operating your unit, and ultimately, less salt will enter the environment.

Verify how your softener is calibrated. Some manufacturers preset their softeners at a very high hardness level. This level is represented in grains per gallon. Brookfield has a very hard water supply at around 23 grains. If necessary adjust the hardness level down to 23 grains.

Use minimum salt dosage needed for regeneration. Regeneration is most efficient at the beginning of the brining cycle. By setting your water softener to regenerate more frequently and using less salt for each regeneration can increase efficiency and result in significant savings for you.

If you have a timer based regeneration system, check the timer; you may be able to increase the interval between regeneration cycles without affecting water quality. Increase the time by one day and see if there is any noticeable affects with laundry or dishwashing for one month. Continue doing this until you notice hardness in the water or you have to add more soap to produce suds. When this time period is determined then set the timer back one day.

Switch from a timer to a demand initiated regeneration (DIR) control. DIR controls are much more efficient in the regeneration process because they use either a flow meter or sensor to determine when to begin the cycle. This type of control is more expensive, but it will pay for itself in as little as 3 years from reduced salt and water use.

For large water users, commercial, and industrial facilities, upgrade your current water softener with a brine reclaim system. Brine reclamation diverts a portion of the brine used to regenerate the softener back to the brine tank. Once the resin bed becomes regenerated, the “sweet” brine is stored in the tank, perfect for reuse. This control system can potentially reduce your salt expense by 25% or more and decreases water consumption. A typical return on this investment can be as little as 1 year.