BUFFALO POUND WATER TREATMENT CORPORATION

Feature Sheet – How Do We Treat Water?

The Buffalo Pound Water Treatment Plant is staffed 24 hours a day, 365 days a year with dedicated and highly trained water quality experts. Through the use of sophisticated control systems, and advanced instrumentation, the Plant ensures a continuous supply of high-quality water to its customers, in quantities that meet their needs.

What is the BPWTC's Water Treatment Process?

The Buffalo Pound Water Treatment Plant (BPWTP) uses multiple processes to remove impurities such as algae, bacteria, clay particles and dissolved organic materials from the water in Buffalo Pound Lake, to produce high quality water that is clear, odour-free, aesthetically pleasing and safe to drink.

Raw lake water enters the pumping station located on the south shore of Buffalo Pound Lake, through two submerged intakes, and then flows through "fish screens" which filter out large debris, such as sticks, logs, fish etc., which could damage the pumps. Once through the "fish screens", the raw water is pumped to the treatment plant via two pipelines connecting the pumping station to the main treatment plant.

After reaching the Plant, water is initially divided into two streams, each of which moves through the cascade de-gasification, coagulation/flocculation and clarification stages. The streams are then recombined for the final stages of treatment, including filtration, carbon adsorption, UV disinfection, and chlorination.

Cascade process for de-gasification

The Cascade process for de-gasification is normally used in times of excessive dissolved oxygen levels in the raw lake water. Excessive levels of dissolved oxygen in the water is the by-product of significant algae growth, and ice-cover in the winter, or calm light winds in the summer.

The dissolved oxygen is removed using the cascade de-gasification process, in the water falls over down a series of steps. The process releases the excess dissolved oxygen and prevents the formation of oxygen bubbles in later treatment processes. Oxygen bubbles can attach to particles in the water that have formed a fluffy precipitate called floc and can cause these particles to float rather than sink. These floating particles then bind to the filters, reducing filter capacity to remove floc.

Coagulation/ Floccation

Aluminium sulphate (alum) is vigorously mixed with the water. The alum neutralizes surface charges on any natural organic matter contained in the water, and forms a fluffy material (floc), causing the material to precipitate, or drop to the bottom of the tank. The floc also entraps particulate matter such as sand, silt algae and clay.

Clarification

The floc-bearing water flows through a number of settling basins, called clarifiers, where most (more than 95%) of the floc with its entrapped impurities is allowed to settle to the bottom of the basin, while clear water is removed from the top. The clear water is then chlorinated for disinfection. The settled floc is removed from the clarifiers as sludge and is pumped to holding lagoons where it is further separated into clear water which is returned to the lake, and solid sludge which is removed for disposal.

BUFFALO POUND WATER TREATMENT CORPORATION

Filtration

Any floc remaining in the clarified water following the clarification process, is removed by filtration. The filters used in this process, consist of anthracite, silica sand, garnet sand, and gravel. The water passes through these mixed media layers, removing the remaining floc. The floc which accumulates in the filter layers is periodically removed by a cleaning process called backwashing.

Carbon Absorption

The Carbon Absorption phase is included only during the months of May to December and is used to remove dissolved organic impurities which cause taste and odour in the water. This phase involves large rectangular tanks which contain Granular Activated Carbon which is three metres deep in the tank.

Water is lifted by Archimedes screw pumps from the bottom of the mixed media filters to the top of the tanks, where it flows down through the Granular Activated Carbon. The Granular Activated Carbon contains many microscopic pores that adsorb the dissolved organic impurities, such as cyanobateria growth, which is largely the cause of objectionable taste and odour in the water.

Ultra Violent Disinfection

Following the Filtration stage (or following the Carbon Absorption stage), the water is disinfected using Ultraviolet light. While UV Disinfection is used because it is especially effective for inactivating microscopic parasites such as Giardia and Cryptosporidium it doesn't alter the water quality, as do other disinfectant products. UV Disinfection however is not an ongoing disinfectant, so chlorine must also be added after UV disinfection.

Chlorination after UV Disinfection

Chlorine is added to the water in the final stage, following the UV Disinfection. As a disinfectant, chlorine is very effective at inactivating bacteria and viruses, and is the most commonly used drinking water disinfectant. In fact, chlorination has been used to improve the safety of drinking water in Canada for the past 100 years. The process helps to ensure water is free of microorganisms that can cause serious and life-threatening diseases.

Pumping to the Cities

Once cleaned and disinfected, high quality clear water is pumped from the Buffalo Pound Water Treatment Plant to the cities of Regina and Moose Jaw, and to a number of other agencies which supply water to the Regina and Moose Jaw region. The Buffalo Pound Water Treatment Plant supplies drinking water to approximately 260,000 residents from across southeastern Saskatchewan on a daily basis.