AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION
REGIONAL MUNICIPALITY OF HALTON - HALTON, ONTARIO CANADA

DESIGN DAILY FLOW
112 MGD (427,000 m³/day)

AQUA-AEROBIC SOLUTION
Aqua ElectrOzone™ Ozone Generation System

HALTON CHOSE METAWATER OZONE GENERATORS FOR HIGH EFFICIENCY AND INDIVIDUALLY COOLED DIELECTRICS DESIGN

Established in 1974, the Regional Municipality of Halton covers just shy of 1,000 square kilometers of beautiful towns and countryside, sandwiched in between the Great Lakes of Huron and Ontario. Home to more than a half-million people, the Municipality supplies more than 112 million gallons of drinking water per day to roughly 630,000 connections, nearly 70% of those residential. Ensuring safety and customer satisfaction with the quality of the supplied drinking water is a high priority for Halton.

While the Municipality has a long, proud history of providing drinking water of excellent quality, the use of surface water from the Lake Ontario would from time to time complicate this endeavor. Depending on weather conditions, algal blooms occur on the surface of the lake between roughly July and November. As these blooms complete their natural lifecycle and die off, they transfer organic compounds like geosmin and 2-MIB into the water. While harmless to human health, these compounds impart a “musty” or “earthy” taste to the water, which is difficult to reduce with classic water treatment techniques.

Right at the outset of the 21st century, the Regional Municipality of Halton began investigating alternatives to their disinfection program, which relied on chlorination as the backbone of the process. While drinking water chlorination has enjoyed more than a century of effective use, studies over the last few decades have found that disinfection byproducts like trihalomethane (THM) and haloacetic acids (HAA) present a significant threat to human health. Combined with the ineffectiveness of chlorination on taste and odor concerns and the Municipality’s desire to establish a voluntary standard for reduction of the Cryptosporidium protozoa, one of the treatment alternatives that the Municipality investigated in 2000-2001 was ozonation.



One of the Ozone Generators at the Burlington Plant

Having decided that ozone was the future of drinking water treatment in Halton, the Municipality invited various manufacturers to submit proposals for providing such a system. Metawater proposed a system incorporating their state-of-the-art high efficiency ozone generators into a multi-plant approach, with recommendations for a 550 kg/day system at the Burlington plant, a 480 kg/day system at the Oakville plant, and a 180 kg/day system at the Burloak purification facility. While efficiency in terms of kilograms of ozone generated per kilowatt hour of power expended was the ultimate factor in choosing Metawater, Project Manager Bill Mundy with the Municipality also felt that “Metawater’s innovative design, incorporating individually cooled dielectrics” was an attractive feature as well. After securing the contract, the construction process proceeded quickly, with the Burlington plant coming online in 2004, and the Oakville and Burloak systems started up in 2008.

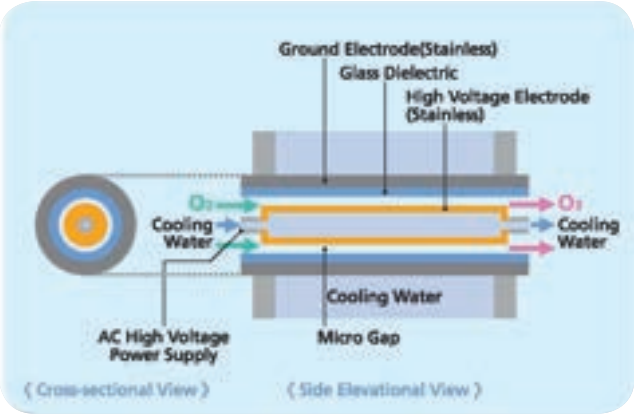
Aqua ElectrOzone™ PROCESS

Ozone is produced by passing concentrated oxygen in between two electrodes in a high-voltage environment. The electrical current or "coronal discharge" disassociates O_2 molecules into oxygen radicals, which react with other oxygen molecules to form O_3, commonly known as ozone gas. This highly reactive gas is then dissolved into the water by a Venturi–style injector and retained in solution for a predetermined length of time.

Ozone is capable of destroying precursors to chlorination DBPs, dramatically reducing their formation even if chlorine and chloramines are used later in the water treatment process.

After the predetermined contact time has elapsed, the remaining ozone is removed from the water and destroyed by a heat and catalytic media process. The off-gas is vented to the atmosphere as harmless carbon dioxide and oxygen, and the treated drinking water, now safe and odor-free, is passed on to the final stages of treatment and distribution.

The modular nature of the ozone generator, contactor, and destructor sets allows ozone production and dissolution to be ramped up during times of either high water demand or enhanced treatment needs (such as the seasonal blooms), and turned back down during low-demand times in order to produce cost savings and maximize process efficiency. This level of detailed process monitoring and control allows the plant to continuously administer the treatment in the most efficient and effective manner possible, making it an ideal solution even as the demands change over time.



Glass-lined Dielectric Assembly (Double Cooling System)

Aqua ElectrOzone™ ADVANTAGES

- Robust design with low breakage
- Reduced discharge gap results in power savings
- Solid state pulse width modulation power
- Precision engineered for high dimensional accuracy
- Consistent ozone generation
- Extremely low failure rates
- Double cooling option allows for increased forced water cooling of each electrode, ensuring original ozone production specifications after years of reliable operation
- Low harmonics
- Oxidizes taste and odor causing compounds
- Coloring components such as pigments and humic substance are decomposed and bleached
- Decomposition of harmful substances and various types of cleansing
- Virus, bacteria and fungi are disinfected and made inert



Multiple Ozone Generators at the Burlington Plant (550/kg/day)

The ozone treatment system was able to eliminate foul tastes and odors brought on by the algae blooms, resulting in a 50% reduction in the number of complaints to the Municipality about the taste of the water. The flocculation and separation of particulate matter earlier in the treatment process reduced the load on the plant filtration systems, nearly doubling the runtimes of the filters between backwashing. Disinfection byproducts such as THMs and HAAs were reduced by 30-40% on average, due to precursor elimination by way of ozone oxidation.

With the Municipality experiencing double-digit growth rates over the previous decade, and with the total regional population expected to increase by 45% in the next 15 years, this is just the beginning. The Burloak plant is expected to increase its capacity from 55 MLD today to 130 MLD in the near future, with the ultimate capacity projected to increase to 220 MLD in the coming decades. Aqua-Aerobic Systems and the cutting-edge ElectrOzone generator will be there every step of the way.

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