AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION
WYLIE WATER TREATMENT PLANT - WYLIE, TX

DESIGN DAILY FLOW
770 MGD (2,914,758 m³/day)

AQUA-AEROBIC SOLUTION
Aqua ElectrOzone™ Ozone Generation System

THE WORLD'S LARGEST DRINKING WATER PLANT USING OZONE SERVES 1.6 MILLION CUSTOMERS

Less than a half-mile from the picturesque shore of Lavon Lake sits the Wylie Water Treatment Plant, operated by the North Texas Municipal Water District (NTMWD). The Wylie Plant provides drinking water to 1.6 million customers on a daily basis, a figure that is expected to double by 2050. The task of supplying billions of gallons of safe, great-tasting water per year to more than ninety communities across ten counties, is a responsibility that the NTMWD takes very seriously.

The addition of chlorine and chloramines for drinking water disinfection has been a staple of water treatment for more than a century, but recent investigations into harmful compounds created by this process have cast doubt on the long-term sustainability of this approach. In 2006, the Environmental Protection Agency (EPA) issued new guidance for the control of these harmful disinfection byproducts (DBPs) like trihalomethane (THM) and haloacetic acid (HAA), which in turn required that the district develop methods for reducing these contaminants.

Additionally, like many surface water supplies, Lavon Lake experiences seasonal algae blooms. While these organisms do not present a threat to human health, they can impart an unpleasant, "earthy" taste to the water, leading to customer complaints. While drinking water chlorination provides benefits, it is unable to remove the compounds that produce this taste and odor.

Facing new limits on acceptable levels of DBPs in the drinking water, as well as age-old complaints about the taste of the water during the summer algal bloom, the NTMWD turned to ozone disinfection as a possible alternative able to address both concerns. After carefully reviewing the alternatives, the NTMWD made a decision in 2008 to begin developing plans for an ozone treatment system, and in 2009 selected Metawater USA as the



3900 PPD (12%) Generators at Wylie, TX

equipment supplier, based on Metawater's extensive experience with ozone treatment and their reputation for excellence and innovative design. The plan called for the installation of 11 ozone generators, 6 at the north facility and 5 at the south facility, each capable of producing 3,900 pounds per day of 12% ozone gas, by weight. With a potential peak generation capacity of 42,900 pounds of ozone per day, the Wylie installation was at the time and remains today the largest ozone installation for drinking water in the world.

Ground was broken in early 2011, with the equipment delivered later that year. Construction and installation work continued for the next several years, with the northern generation facility substantially completed in May of 2014, and the southern facility completed in October. By early 2015, the new ozone generators were providing disinfection and taste/odor reduction for up to 770 million gallons of water per day, at an annual operating cost of less than a nickel per thousand gallons.

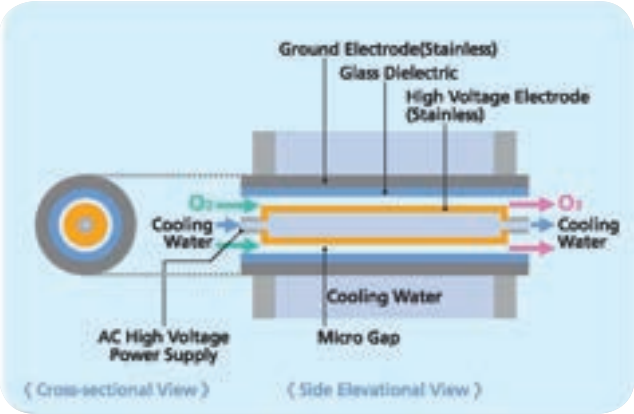
Aqua ElectrOzone™ PROCESS

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 NTMWD to continuously administer the treatment in the most efficient and effective manner possible, making it an ideal solution even as the demands and needs of the District’s customers 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



Ozone Destruct System

Since startup, the ozone generation systems have consistently met or achieved their treatment objectives, preventing the formation of DBPs within the guidelines of the D/DBP2 rule and below the stipulated Maximum Contaminant Level for these byproducts. The state-of-the-art control system has also provided greater flexibility to the Wylie plant operators, allowing fine-tuning of ozone dosage in order to effectively respond to taste and odor events precipitated by the algae blooms. This important, cutting-edge upgrade will allow the NTMWD to provide safe, clean, great-tasting water to their millions of customers for many decades to come.

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