



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION

PALM COAST WATER TREATMENT PLANT #3 - CITY OF PALM COAST, FL

DESIGN DAILY FLOW

0.75 MGD (2,835 M³/DAY)

AQUA-AEROBIC SOLUTION

Aqua ElectrOzone[®] M-Series 10x OZONE GENERATION SYSTEM



COLOR OF RO CONCENTRATE REDUCED IN UNIQUE APPLICATION

The City of Palm Coast was experiencing elevated color in the concentrate stream being directed to the lime softening facility to recover as drinking water. In an effort to meet secondary color standards at the lime plant, this water quality issue limited the volume of the concentrate able to be recovered. City staff and CPH Engineers identified O₃ as a potential method to reduce color from the concentrate stream. Pilot testing was conducted in the fall of 2012/spring 2013. The testing demonstrated that O₃ could effectively address color issues and improve concentrate quality to the lime plant and was the lowest cost alternative for treatment. Budget and schedule issues were significant challenges in the project in order for the City to receive Florida Department of Environmental Protection and St. Johns River Water Management District grant funding.

Approach

Pinnacle worked closely with City staff and the engineers at CPH to develop a comprehensive ozone system for this project. Pinnacle provided pilot equipment and process optimization services to prove design specifications for the application. Then, Pinnacle provided an integrated design approach for the entire ozone process. The final design included an onsite oxygen generator, Pinnacle's modular Summit ozone generator, closed loop chiller system, venturi based ozone injection system, and ozone off gas destruct system.

A unique aspect of the project is controlling ozone dose using both dissolved ozone and dissolved color. The dissolved ozone probes provide control of the ozone injection process, however, the dissolved color meter provides the final compliance point and allows for automatic adjustment of the ozone dose. The integrated system automatically adapts and compensates for changes in concentrate water quality from the plant.

Another significant challenge to the project was budget and schedule. In order to qualify for available Florida Department of Environmental Protection and St. Johns River Water



Pinnacle M-Series 10x ozone system RO system concentrate stream reduced from 62 true color units (TCU) to less than 30 TCU for drinking.

Management District grant funding, the City needed to complete the entire ozone project in less than six months. Pinnacle Ozone was able to manufacture and deliver all of the equipment for the ozone process within 6 weeks of receiving the purchase order. By working closely with the contractor Sawcross, Inc, Pinnacle was able to deliver the project within the schedule needed to receive grant funding.

Results

In preliminary startup and testing, initial results of the ozone treatment system have met and exceeded performance goals. Pinnacle provided a complete and fully integrated ozone system including an onsite oxygen generation system, side stream injection, closed loop chiller, and an off gas ozone destruct unit. The entire system was delivered and substantially completed in less than 12 weeks in order to meet the deadlines for project funding.

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 O₂ molecules into oxygen radicals, which react with other oxygen molecules to form O₃, 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 City of Palm Coast 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 city’s customers change over time.

Aqua ElectrOzone® ADVANTAGES

- Robust design with low breakage
- Reduced discharge gap results in power savings
- Pulse density modulation power
- Precision engineered for high dimensional accuracy
- Consistent ozone generation
- Extremely low failure rates
- Industry’s only truly modular and expandable ozone generator
- 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



Modular QuadBlock ozone generator cells.



Ozone injection set detail.

M-Series 10x

(Up to 162 PPD)

Quick Specs.	M-Series 10x
Ozone Cap. (ppd)(kg/hr)	162 ppd (3.1kg/hr)
Ozone Conc. (% BW)	8-14% BW
Max O ₂ Feed (slpm) [scfm]	551 slpm [19.5 scfm]
System Turn-down	0-100%, linear
Weight (lbs.)	2020 LBS.
Electrical Service	460 VAC/3 Ø/50-60Hz/40A

