

Keeping the Chloramine Monster Out of an Indoor Aquatics Center

A case study after nine years of using UV chloramine disinfection to improve air and water quality in Cobb County, Georgia Parks and Recreation

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Cobb County, Georgia, opened its Mountain View Aquatics Center in 2000 and fell victim to the ongoing problems that plague almost every indoor aquatics center around the world: poor air quality, poor water quality and corrosion of its stainless steel equipment.

Robert McCallister, CPRP, Aquatics Director for the Cobb County Parks, Recreation, and Cultural Affairs, did not just stand by and watch his new facility fall apart during its first few years of inception. Tax payers spent a considerable amount of money to build the premier facility and the community support was tremendous.

The pools were crowded at all times of the day throughout the year, a tribute to the skill of programming. However, it was apparent that action was required to account for the poor air quality, water quality, and corrosion that was caused by the by-product of treating the water with chlorine-based chemicals that combine with ammonia compounds (oil, sweat, etc.) to produce “chloramines.”

After countless hours of research and trying several options, Cobb County turned to UV treatment as a solution for their Mountain View facility’s chloramine issue. McCallister was very skeptical at first as Cobb County had storage rooms full of products, each claiming to be the best solution to the problem. After a guarantee was provided by a U.S.-based UV company, McCallister decided to move forward with the UV system.

A caveat struck during the deal was the understanding that if the UV systems did not perform to the level guaranteed, the manufacturer would remove the UV system at no cost to Cobb County. To perform as promised meant the combined chlorine levels would be an average of 0.3 ppm or less at all times.

Several factors went into the sizing and design of the UV system at the Mountain View Facility.

- Taking into account the laws of dilution as they

affect UV system performance, it takes 3.5 times the turnover rate for every drop of water to pass through the UV system. Therefore, if the pool was on a six-hour turnover rate, a UV system would need 21 hours to fully treat all poolwater. Based on this principle, some water will be treated several times and some will only pass through the UV light once

- Combined chlorine readings should be lowest in the morning, as the UV system operated throughout the night with no bathers or demand on the pool. Combined chlorine levels will then continue to rise throughout the day as the bather load starts to increase and peaks usually in mid-afternoon. Sizing of the system must take into account the peak load on the pool, to ensure that combined chlorine levels are kept within the specified levels
- To test combined chlorine levels and prove the performance of the UV system, a sample port should be installed directly before and after the UV system. Taking a sample before and after the UV system will show the reduction in combined chlorine, which was guaranteed to be between 0 and 0.3

After two weeks of operation, the facility reported a drastic decrease in combined chlorine levels, and an improvement in the air quality and water quality at the facility (Figure 1). The facility decided to purchase the UV systems before the guarantee period offered by the manufacturer expired.

Cobb County has several facilities in operation today and each one has installed a UV system as the standard solution for reducing chloramines. Not only do the sites have better air and water quality, along with improved life of stainless steel, but they now also receive the added benefits of UV disinfection.

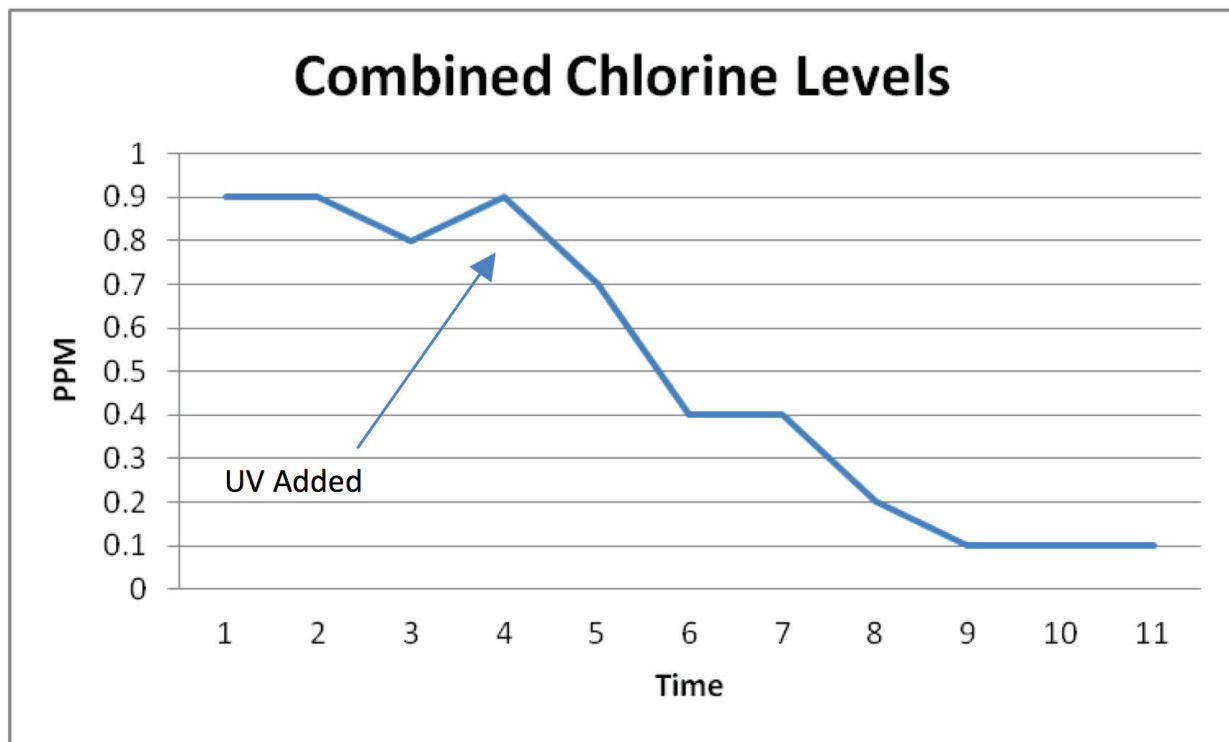


Figure 1

Nine years after installation, the UV system continues to perform as well as it did after its inception with only standard, routine maintenance. The lamp is changed yearly, with several lamps lasting over 10,000 hours, versus the 8,000 hours warranted by the manufacturer.

The science behind UV lamp technology is continuing to improve. On average, medium pressure UV lamps last approximately 8,000 hours and most manufacturers will warranty them for 4,000 hours. The quartz sleeve and automatic wiper seals and rings are changed every 2 - 2.5 years. This accounts for all of the routine manufacturer's maintenance that is required on the UV system.

As swimming pool natatorium design and construction evolves to keep up with the changing HVAC codes, it is important to keep in mind that the UV system is treating the water, not the air. The laws of dilution will limit the effectiveness of a UV system during peak events, such as swim meets when hundreds of swimmers use the pool continuously for several hours.

Cobb County is well aware that during a swim meet, the combined chlorine before the UV may be 0.7 ppm, and between 0-0.2 ppm after the UV. But the air quality will be worse than normal during this period due to the higher bather load. Cobb County wanted to ensure the safety of not only their swimmers but the

staff and patrons watching the meets as well, so they also installed an additional HVAC device to operate during these peak hours and remove the airborne chloramines. This dual approach has ensured the protection of the swimmers and the public.

The UV system gave Cobb County the peace of mind that their chloramine problem was being addressed, but also delivered the added benefits of UV disinfection immediately upon installation. The majority of new pools being designed and constructed will have a UV system installed as base bid equipment. The staff at aquatic facilities will not experience the "monster" that comes along with managing an indoor natatorium.

According to McCallister, "I'm convinced that the UV system combined with the HVAC chloramine evacuation system make Cobb County's facilities some of the finest aquatic venues in the county."

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Dr. Psaroudis held the position of National Sales Manager for PurAqua Products and is currently the National Aquatics Sales Manager for Aquionics Inc., a manufacturer of ultraviolet disinfection technology for water and wastewater in the industrial, municipal, and aquatics markets.