



City of Crossville, Tennessee

Mixed Oxidants Reduce Operational Costs, Improve Safety and Performance

The Situation:

The City of Crossville, Tennessee, needed to address increasingly strict regulations on the use of gas chlorine to disinfect their community's water.

The Solution:

By switching from gas chlorine to MIOX mixed oxidants, the City has reduced operational costs, improved residual durability, reduced byproduct formation, produced longer filter runs and eliminated the safety and liability issues involved with using chlorine gas.



The City of Crossville, Tennessee, located 110 miles east of Nashville in Cumberland County, operates two water treatment plants – Meadow Park and Holiday Hills - that serve the City's community of 11,500. Each plant uses surface water from two small lakes as its raw water source and produces 3.5 MGD of treated water. In 1999, Crossville began investigating alternative water disinfection methods in an effort to improve the safety of their plants, reduce the potential liability involved with using and storing gas chlorine, a hazardous and regulated chemical, and reduce disinfection byproducts (DBPs). Between the inherent safety risks involved with transportation of gas chlorine and stricter regulations imposed by the Risk Management Program (RMP) and the Disinfection Byproducts Regulations (DBPR), a section of the Safe Drinking Water Act, chlorine gas was no longer an attractive water disinfection method.

Crossville's research produced MIOX Corporation's on-site mixed oxidant generation technology, a technology that would produce non-hazardous disinfectant on site at each water plant, eliminating the need for a costly RMP program and significantly reducing the City's liability exposure. Further research indicated that MIOX's mixed oxidants provide better disinfection than chlorine-only disinfection, improved residual durability and stability, and had been shown to reduce byproducts formation in systems throughout the U.S. The City decided to use MIOX on-site generated mixed oxidants in both of their plants and by the end of 2000 both systems were online, replacing their old chlorine gas systems.

Within months of using the MIOX system, significant improvement was observed in the consistency of the system's chlorine residual; residual has reduced "dead spotting" in low flow areas, and much higher residual was noted in areas that had been difficult to maintain. With gas chlorine, a residual of 3.3 PPM was required to attempt to maintain residual throughout distribution. Using mixed oxidants, a residual level of just 1.7 PPM was required to maintain residual throughout Crossville's large distribution system.

At the end of the first year of operation, Crossville had also documented a reduction in their disinfection byproducts formations. Both TTHMs and HAAs were reduced by 50% compared with the quarterly results from the previous year when gas chlorine was still employed. Because of the unique disinfection properties of MIOX mixed oxidants, biofilm buildup in the distribution system was reduced or eliminated, lowering oxidant demand and distribution microbial contamination, resulting in better disinfection performance.

Historically, Crossville had to shut down filters and use a chemical to remove the stains created by manganese and iron. The use of MIOX produced much faster oxidation of manganese and iron, reducing troublesome staining of the filter walls, saving the time and resources required to remove the stains. Improved filter operation and reduced chemical usage resulted in longer backwash cycles - from two days between backwashes using chlorine gas to four days with mixed oxidants - which created higher water production rates and less stress on backwash lagoons.

The use of MIOX mixed oxidants reduced operational costs for the City of Crossville while improving residual durability, reducing byproduct formation, producing longer filter runs, and eliminated the safety and liability issues involved with using chlorine gas. Because of the cost savings and performance and process advantages offered by MIOX mixed oxidants, Crossville decided to upgrade to the newer MIOX RIO™ systems. Four new systems – two RIO M3s at Meadow's Park and two RIO M2s at Holly Hills – have been running successfully since January 2009. The new RIOs have a modular design that allows for easy expansion of production capacity without increasing the system footprint. The corrosion-resistant systems have a high density polyethylene rotomolded enclosure and an aluminum frame that provides a safe, modular, industrial design.

The new RIO mixed oxidant generating systems at Crossville provide greater efficiencies by using less power and salt per pound of generated oxidant and maintenance is reduced with the use of air cooling instead of the water cooling used in the previous MIOX systems. The new systems can be easily expanded by adding additional 60 ppd cell modules to the existing generating cabinets so the system can grow with Crossville, providing the City with the flexibility and durability to meet their existing and future disinfection needs.

About MIOX Corporation

MIOX Corporation (www.miox.com) is focused on solving one of the world's most pressing issues: the need for affordable, safe, and healthy water. MIOX's patented on-site water disinfection technology safely and economically generates either hypochlorite or advanced mixed oxidant using just salt, water and power, replacing the need to purchase, transport and store dangerous chemicals. MIOX is safely used in over 30 countries for public drinking water systems, water reuse projects, and non-municipal applications including the food and beverage, power, and aquatics



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