

## CASE STUDY

**MaximOS™**  
City of Crossville, TN



# Crossville removes biofilm and improves water quality with mixed oxidants

The City of Crossville operates 2 water treatment plants; both use surface water, from 2 small lakes as their raw water source. Both conventional plants are rated to produce 3.5 mgd each.

In 1999 Crossville Water Superintendent Jerry Kerley began investigating alternative water treatment disinfection methods in an effort to reduce the potential liability (RMP) involved with using and storing gas chlorine a hazardous and regulated chemical. Further Crossville was also looking to reduce potential disinfection byproducts issues that new and difficult regulations were requiring.

Chlorine gas was the main target in both of these new government regulatory acts, the Risk Management Program (RMP) and a section of the Safe Drinking Water Act known as the Disinfection Byproducts Regulations (DBPR). Unfortunately for Crossville the chlorine gas that they were using for disinfection was the major chemical targeted by these new regulations.

During his research Jerry became aware of a technology that produced non hazardous disinfectants onsite at each water plant, which would eliminate the need for the costly RMP program, and significantly reduce the Cities liability exposure. The onsite generation technology as developed and sold by Miox Corporation produces a mix of oxidants (MOS) that have a better disinfection ability than chlorine

only disinfection. Further research also indicated that MOS had reduced byproducts formation in systems throughout the US, and that residual durability and stability was much improved by the use of MOS. The city decided to use onsite generated mixed oxidants in both of their plants and by the end of 2000 both systems were online, and the chlorine was removed.

Within months of utilizing the MOS system a difference was noted in the systems residual, residual was no longer dead spotting in low flow areas, and much higher residual was noted in areas that had been difficult to maintain. Over a period of time Crossville was able to reduce the residual level going into the system, with chlorine a residual of 3.3 PPM was required to attempt to maintain residual, with MOS only a 1.7 PPM residual level was required to better maintain residual throughout Crossville large distribution system.

At the end of the first year of operation Crossville had also documented a reduction in their disinfection byproducts formations. Specifically both TTHMs and HAAs were both reduced by 50% in direct comparison with the quarterly results from the previous year. Because of the unique disinfection properties of mixed oxidants (MOS), biofilm buildup in the distribution system are eliminated overtime, thus oxidant demand is lowered, as is distribution microbial contamination leading to better disinfection performance.



The use of MOS also produced much quicker and complete oxidation of Mn and Fe, this eliminated the staining of the filter walls that had been a problem. Crossville had previously had to shutdown filters and use a chemical to remove the stains created by the Mn and Fe.

Because MOS usage also improved filter operation and reduced chemical usage backwash cycles went from 2 days (between backwashes) when using chlorine to 4 days when using Miox. This created higher water production rates, and less stress on backwash lagoons.

The use of MOS has saved the City of Crossville operational money, while improving residual durability, reducing byproduct formation, produced longer filter runs, and eliminated the safety and liability issues involved with using chlorine gas.

Because of the many performance and process advantages Crossville enjoyed due to longtime use of mixed oxidants, and in continuing efforts to improve process and cost efficiencies within their system Crossville decided to upgrade the new systems.

The new systems provide greater efficiencies by using less power and salt per pound of generated oxidant. The systems are also easier to maintain due to the use of air cooling in lieu of the water cooling which was used in the previous Miox systems. The new systems are easily expanded by just adding additional 60 ppd cell modules to the existing generating cabinets.

The new MOS systems have been in operation since January of 2009. These new MOS systems provide Crossville with the flexibility and durability to meet their existing and future disinfection needs.

Update: The City of Newport TN water system has also installed their new MOS system also, Newport has had Miox technology in use since 2000. Recently due to a non disinfection issue Newport had to use bulk hypo for disinfection they found that their byproducts increased when using bulk versus MOS, and they also found that they had to dose at a much higher rate with hypo, and still could not maintain the residual that they were able to with Miox. Thus Newport like Crossville will still be enjoying the disinfection benefits provided by Miox technology, while lowering the usage of the salt and power needed for the new MOS system operation. ■



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