CASE STUDY
Better Legionella Risk Management

MIOX eliminates biofilm that habors Legionella.

90% LOWER COST THAN CHEMICALS

LOCATION

Large Teaching Hospital
Illinois, USA
3,000 ton cooling tower

EQUIPMENT

MIOX AE-4 MOS system
Installed 2011

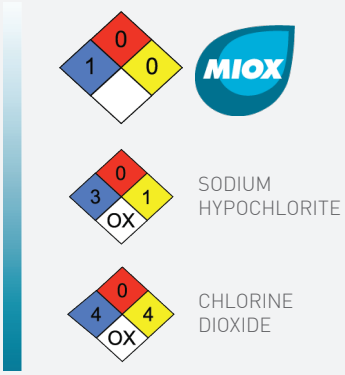
PREVIOUS DISINFECTION

12.5% Sodium Hypochlorite
DBNPA
Algaecide + manual brushing

A SAFER OXIDANT

MIOX's only precursor (salt) is inherently safe. The solution is generated at a <1% concentration with zero PPE requirements.

NFPA Health Ratings
0-Normal Material
1-Slightly Hazardous
2-Hazardous
3-Extreme Danger
4-Deadly



CUSTOMER'S CHALLENGE

In 2011, a discovery of positive Legionella counts in the cooling towers at a large, well-respected teaching hospital in Illinois required immediate intervention.

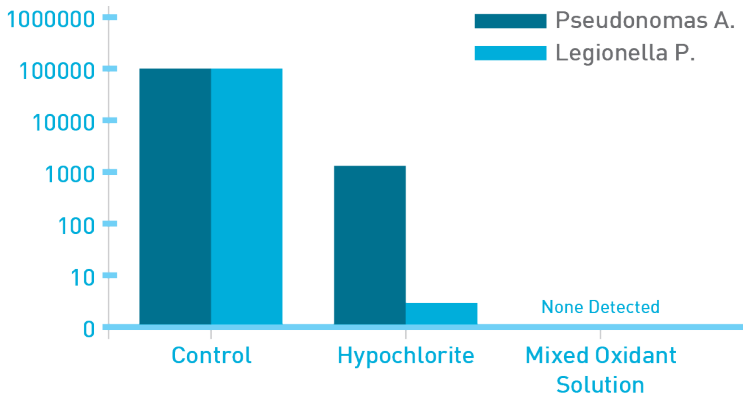
SOLUTION

Earthwise replaced the previous cooling tower water treatment regime with a MIOX AE-4 Mixed Oxidant Solution (MOS) system. MIOX on-site generators utilize salt, water and electricity to generate <1% concentration MOS disinfectant to remove biofilm and algae, increase free available chlorine (FAC) residuals and inactivate microorganisms (including Legionella) for cooling tower disinfection.

BETTER LEGIONELLA CONTROL

Legionella bacterial group is very easy to inactivate when it comes in direct contact with commodity sodium hypochlorite. However, when there is biofilm in the system, the Legionella behind the biofilm may not get in direct contact with hypochlorite. These biofilm layers are often established by a bacteria group called Pseudomonas aeruginosa, which are extremely tough to inactivate with hypochlorite. In this case, water treatment programs require something better, like MIOX, that can penetrate the biofilm layer and inactivate Legionella.

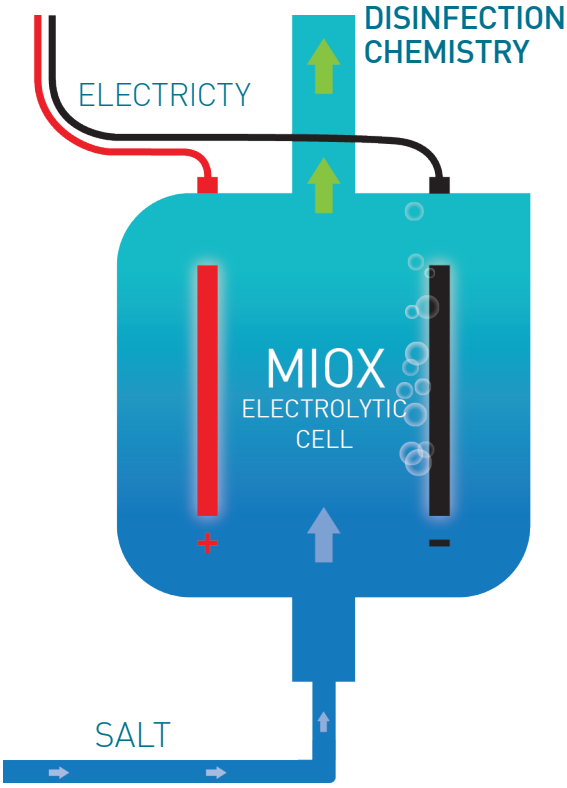
As confirmed by 3rd party studies, like the study conducted by Larry Barton, Ph.D., "Disinfection of Simulated Cooling Tower Water", MIOX is shown to be more effective at inactivating Pseudomonas aeruginosa compared to Hypochlorite, and therefore is better at controlling Legionella pneumophilia.



Source: Larry Barton, Ph.D., University of New Mexico, "Disinfection of Simulated Cooling Tower Water," March 4, 1996.

ELECTROLYSIS PROCESS

The electrolytic cell of a MIOX on-site chemical generator uses salt combined with water and electricity to generate disinfectant at the point of use.



RESULTS

The MIOX system was installed in July 2011:

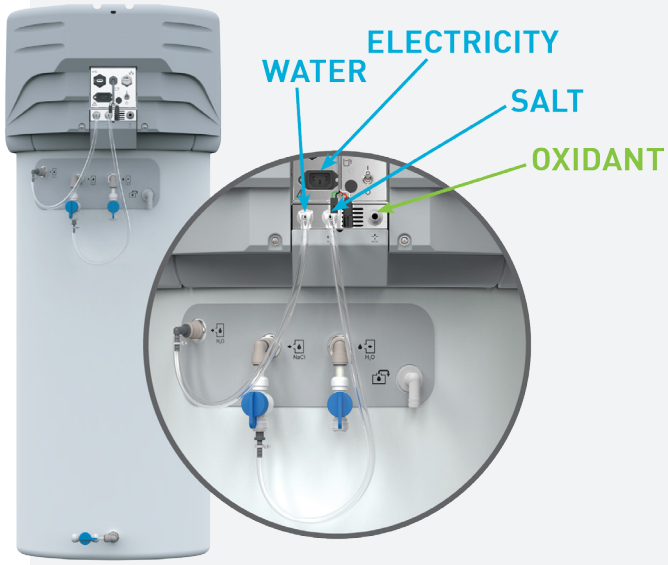
- Within 3 weeks of operation, zero positive Legionella readings were been observed.
- Lower oxidant dosage was achieved compared to the previous regime.
- The cooling tower has been visibly cleaner and free of biofilm and algae growth.
- Storage and handling of hazardous bulk Hypochlorite and DBNPA chemical drums inside the hospital has been completely eliminated.
- Reduced water and energy footprint.
- Established remote monitoring of the system for better peace of mind for the plant operations.

CONCLUSION

Biofilm removal is a critical step to controlling Legionella because it hides inside the biofilm.

Inactivating Legionella is easy when the protective biofilm is not present.

FAC residual and biofilm control are both required for long term risk management.



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ON-DEMAND CHEMISTRY