



## MIOX® and the Power Generation Industry

MIOX® Corporation offers the safest water in the world, providing advanced, cost-effective solutions to the power generation industry. Our team designs custom solutions to deliver safe, effective, and economically attractive alternatives to minimize or eliminate the use of expensive and hazardous delivered chemicals. By partnering with MIOX, our customers experience a bottom line savings and operational efficiencies, keeping power generation operations running flawlessly.

### Improved Safety

MIOX systems require only ordinary food grade salt, eliminating the transportation, handling, and storing of hazardous chemical. Maintenance staff does not have to wear protective gear, and there are no storage compatibility issues. Since the solution is stored and injected into cooling tower process water at less than one percent concentrations, the oxidant solution is not considered a hazardous material, but rather an environmentally benign yet highly effective disinfectant.

Truck traffic is reduced in the plant yard as well as in the surrounding community. Due to superior system efficiency, only 2.5 lbs. of salt is required for each pound of chlorine generated, representing a nearly 5X reduction in the amount of “chemical” required. So for every four to five truckloads of bleach, only one truckload of salt is required. A more benign solution, safer source chemicals and reduced truck traffic allows the user to improve safety for both employees and the community.

### Better Performance

MIOX advanced oxidant chemistry is more effective than bromine and bleach and offers the additional benefits of reduced chemical required, reduction or elimination of biocide, and enhanced biofilm removal and control.

Biofilm can cause physical plugging, accelerated corrosion, reduction in efficiency and increased risk of exposure to health concerns from biological contaminant. The gelatinous mass of biofilm can obstruct water flow through the cooling tower fill and tubing and build-up of biofilm reduces the normal  $\Delta T$  heat rejection efficiency of the fill. Areas beneath biofilm deposits are more prone to corrosion due to biofilm excretion product and there have even been reported incidences of fill collapsing due to the weight of biofilm build-up. Biofilm has a thermal conductivity of just 0.6 compared to calcium carbonate at 2.6 – that’s 4X more resistant to heat transfer. Calculations show that a biofilm only 0.045” thick on the condenser tubes of a centrifugal chiller results in a 35% reduction in heat transfer.



Images demonstrate effective biofilm removal

The wet environment in cooling towers is a prime location for *Legionella*-based biofilm formation, which is continuously eroded and dispersed through the aerosols produced during normal cooling tower operation. Legionnaires’ disease results when a sufficient number of the airborne bacteria are inhaled.

Mixed oxidant chemistry can reduce and possibly eliminate the formation of biofilm in the tower and recirculation loop. In existing installations, MIOX systems have been used successfully to remove and control significant biofilm formations from recirculation piping and other surfaces.



#### MIOX Corporation

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## A Sustainable Solution that's Better for the Environment.

Take care of the environment while taking care of your operations. The use of salt and electrolysis replaces the use of hazardous chemicals for water treatment, where there is a 3-to-1 carbon emission reduction when compared to 12.5% sodium hypochlorite. The mixed oxidant solution, stored and applied at less than 1% concentrations, is environmentally benign and not classified as hazardous. Experience the benefits of:

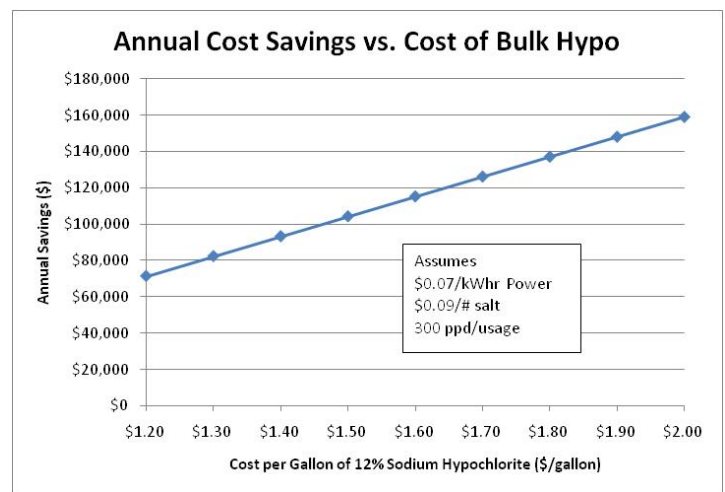


- **Reduced man-hours** for safety training, operations, and compliance
- **Improved worker safety**
- **Improved community relations** - no need to communicate an emergency response plan
- **No RMP or PSM program required**

## A Safe Investment.

Cost-effectively provide disinfection/ oxidation chemicals with on site generation to maintain cooling tower performance. The MIOX system uses salt and electricity to generate a chlorine-based solution that contains other, more powerful, oxidants as well. In addition to replacing bulk bleach, the superior mixed oxidant chemistry makes it equally effective at higher pH. Since oxidants have superior algae-killing properties, additional savings may be realized.

Two main consumables are used to compare costs for generating chemical - salt and electricity. As a result, the estimated operational costs - and savings - is a combination of the salt cost, electrical cost, and cell replacement costs. Depending on the cost of delivered sodium hypochlorite, the annual cost saving could range from approximately \$70,000 to over \$158,000 per year.



**Realize significant annual operating cost savings with OSG**

Many of our customers have been seeing steady, and in some cases, dramatically increasing cost increases, up to 10% or more per year, for bleach over the past two years. Drivers include rising transportation costs and increasing security costs, neither of which is expected to decline in the near future. In contrast, salt and electrical costs have been very stable over the past 5 years, offering a higher degree of confidence in future costs of operating the system.

For more information, contact Tom Muilenberg at 505-224-1031 or [tom.muilenberg@miox.com](mailto:tom.muilenberg@miox.com).



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