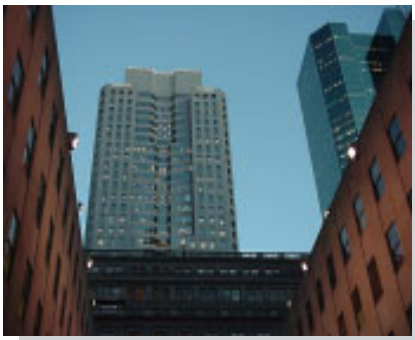
JAMESTOWN CHEMICAL

# VEROX®-8
# Cooling Water Treatment Microbiocide
# Case History at a Large Commercial Building

## Background



A very large and prestigious, dual purpose commercial and institutional property in New York City uses a 1,100-ton refrigeration plant to provide comfort cooling to office space and 436 heat pumps located in student dormitory rooms. The 17,000-gallon open condenser water system operates at 10 cycles of concentration (based on conductivity), with a 3,300 gpm recirculation rate, and a temperature differential of 5 – 30 degrees F. When initially placed online over 10 years ago, the mechanical contractor left the system untreated for a period of 12 – 18 months. Then, for a period of 4 – 5 years, the previous water treatment vendor used a simple inorganic phosphate program in the system to control corrosion and deposition. Unfortunately, these treatment programs caused many long-term operating problems in the system, including:

- Severe microbiological fouling and aggressive underdeposit corrosion.
- Excessive consumption of oxidizing microbiocides such as liquid chlorine and bromine, and BCDMH. Consumption rates for non-oxidizing products, such as glutaraldehyde and isothiazolinone, were also high.
- Persistent foaming problems caused operating difficulties with the electronic controls used to regulate water levels in the system.
- Phosphate, iron and microbiological-based deposits caused severe pitting of the condenser tube sheets, and numerous failures of the schedule 80 black iron distribution piping and copper branch piping.
- Constant blockages in the heat pumps resulted in the loss of climate control in critical tenant and student spaces.
- Elevated concentrations of aggressive oxidizing microbiocides degraded the azole-based copper corrosion inhibitor and accelerated the corrosion of mild steel system components.

Besides the obvious operational problems, these difficulties also significantly increased maintenance costs and power consumption for the system.

## Program Application

Once it became available to the marketplace, Jamestown evaluated the use of VEROX®-8, a stabilized, chlorine dioxide-based microbiocide that is packaged in an easy-to-use liquid form. As a selective oxidizer, chlorine dioxide is not degraded by waterborne organic contaminants and provides broad-spectrum microbiological control over the wide 6 – 10 pH range. In addition, chlorine dioxide will not interfere with other ingredients of the water treatment program or accelerate corrosion rates of copper and mild steel system components.

To facilitate the cleaning process, the feed of all other microbiocides was discontinued, and Verox-8 was

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slug fed to the system on a daily basis at a rate of 200 ppm (as product). After a period of two weeks, bulk water bacteria levels declined to 100 – 1,000 CFU's/ml (as measured by dip slides). Daily dosage rates were then reduced to 80 ppm, and bacteria levels remained steady at 1,000 CFU's/ml, or less. After one month, Verox-8 was then fed to the system on alternative days, and as the only microbiocide in the program, provided the facility with the following benefits:

- Mild steel and copper corrosion rates (as measured with coupons) declined to less than 1.0 mpy and 0.1 mpy, respectfully, with no visible indications of pitting problems.

- Algae deposits were completely eliminated from the system, and foaming problems were no longer an issue.

- Biofilm deposits were slowly removed and eliminated from the system.

- Blockages within the heat pumps have been dramatically reduced.

- Condenser units opened very clean, improving the operating efficiency of the entire system.

- The supplemental feed of steel and copper corrosion inhibitors was discontinued, greatly improving program costs.

## Program Summary

In this difficult treatment application, Verox-8 was successfully used as a "stand-alone", easy-to-use, broad-spectrum, and cost-effective cooling water microbiocide.



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