JAMESTOWN CHEMICAL

VEROX®-8
Cooling Water Treatment Microbiocide
Case History at a Coal Fired Cogeneration Power Plant

Background Information

A 50-mw fossil fuel cogeneration plant located in western New York State operates a 30,000 gpm, forced draft open recirculating cooling water system to provide chilled water to the plant's condenser and auxiliary equipment. The critical 240,000 gallon system operates with a 20 - 30 degree F delta T, typically seeing supply temperatures of 70 - 90 degrees F., and return temperatures of 90 - 120 degrees F. The tower system operates at approximately 15 cycles of concentration (based on conductivity), with a recirculating water conductivity of 3,500 mmhos, a total hardness level in the 1,600 - 2,000 ppm range (as $CaCO_3$), and a pH level controlled between 8.0 and 8.4 via the feed of acid to neutralize alkalinity.

Historically, the system operated with a high suspended solids concentration, as air-borne contaminants from the adjacent coal storage piles were constantly scrubbed from the air and added to the water, a scenario that created ideal conditions for increased microbiological activity within the cooling system. Previously, the plant had used a powdered oxidizing microbiocide, a combined chlorine/bromine compound, with only limited success. In addition, program costs were high and there were frequent mechanical problems with the device used to feed the product to the system.

Program Application

After taking over all water treatment responsibilities at the plant, Jamestown quickly initiated a microbiological control program in the towers that addressed concerns surrounding the mechanical feed equipment while also providing a more economical alternative to the costly dry product. Based upon the high sediment and organic loading at the plant, Jamestown initiated a microbiological control program based upon Verox®-8, a stabilized chlorine dioxide-releasing product. As a selective oxidizer that operates over the broad 6 - 10 pH range, Verox-8 provided the plant with the following benefits:

- Use of a convenient, single drum, liquid microbiocide that only required a simple chemical metering pump and timer for product application.
- Elimination of the troublesome dry chemical feeder and associated mechanical problems.
- Application of a fast-acting oxidizing microbiocide that will not readily degrade in the presence of organic contaminants in the recirculating water.
- Use of a broad-spectrum, single product microbiological control program that is effective against algae, bacteria, and fungi. The product is also able to penetrate and remove existing biofilms from metal surfaces.
- Application of a product that won't react and degrade other water treatment components such as phosphonates, polymer, and azoles, or promote the corrosion or breakdown of system components, including steel, copper, or wood.

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The microbiocide program initiated by Jamestown used a 40 ppm dosage of Verox-8 (as product), fed to the system on a slug basis, twice per week, directly to the tower basin. Microbiological testing performed on the system water showed that planktonic bacteria counts (as measured by dip slides) were constantly maintained below 1.0×10^4 cfu's/ml. In addition, previously developed slime deposits were slowly and completely removed from the system.

Program Conclusions

- Verox-8 proved to be a potent and fast acting microbiocide that was easily administered to the system.
- Use of the troublesome dry chemical feed system was eliminated.
- Bulk water bacteria counts can be maintained below industry standard control ranges by only using twice per week slug additions of Verox-8.

- Slime growths can be completely controlled to below detection limits.
- Excellent results can be obtained at much lower treatment costs than with many traditional oxidizing programs.

Program Summary

Use of the Verox-8 stabilized chlorine dioxide microbiocide enabled this cogeneration power facility to implement a one-drum microbiological control program that significantly lowered program cost, eliminated feed equipment mechanical problems, and provided comprehensive control of bacteria, fungi and algae in the plant's critical open recirculating cooling water system.

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