Reduction on Water Consumption on a Cooling Tower With The Application of a Novel Biocide

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ABSTRACT VERSION 2

Microbiological control is essential in any cooling water system. A cooling system such as a large cooling tower is an excellent environment for micrboloigcal growth: water, warm temperature, oxygen, dust and debries from air, nutrients and others are some of the variables that contribute largely to the growth of microbiology colonies. The main negative consequence is that the biofilm (sludge) formed is highly insulating. It is known that biofilm is more insulating that $CaCO_3$ or SiO_2 scales. The best and less expensive way to control MB is by using large amounts of oxidizing biocides like chlorine gas, hypochlorite, bromine, chlorine dioxide. The goal is to maintain an oxidizing environment which is not friendly for bio cells. However, strong oxidizer may cause high chloride content, lower concentration cycles, higher cost among others. Also, a high oxidant environment may lead to higher corrosion rates. And finally the strong oxidizers are not selective, reacting to any contamination not only MB.

This paper shows the results of the application of a novel mild oxidizer on a large cooling tower at a power plant. This specific cooling tower utilizes grey water (tertiary treated domestic sewage) as make up water. After the application of this mild oxidizer, the concentration cycles were enhanced from an average of 4 up to 6.5, resulting in large savings to the plant. Also, stainless steel corrosion rates droped significantly due to the reduction of chlorides and sulfates residuals.