ElectroBrom and MiniBrom Replacement of Organic Biocides
Die Casting Plant Cooling Towers

01/08

Problem

A large zinc and aluminum die casting plant in Western Pennsylvania was using over $300 per week worth of proprietary isothiazolin and glutaraldehyde organic biocides to control biological growth in one 16,000 gallon volume cooling tower system, the "ZDCW" system. Even at this high biocide dosage, control was borderline; the cooling water was very turbid with a strong septic odor. Controlling biological growth in this system was difficult due to significant contamination by die lube overspray, which contains various surfactants and emulsified oils. The following table summarizes typical analytical results obtained on softened makeup and cooling water samples from this system as operated with organic biocides.

Parameter	Makeup Water	Cooling Water
pH	7.6	8.6
total alkalinity mg/l	245	590
conductivity mmhos	904	3000
calcium mg/l	0.05	38.9
magnesium mg/l	0.11	16.8
iron mg/l	<0.03	7.25
copper mg/l	<0.02	0.71
zinc mg/l	0.062	1.22
total phosphate mg/l	<0.15	15.8
ortho phosphate mg/l		3.12
chemical oxygen demand mg/l		5,416
suspended solids mg/l		400
ATP rlu		2,461
total oil/grease mg/l		266

The plant operators and management were not pleased with either the results or the cost of the biological control program on this, or any of the other four cooling towers in the plant.

Solution

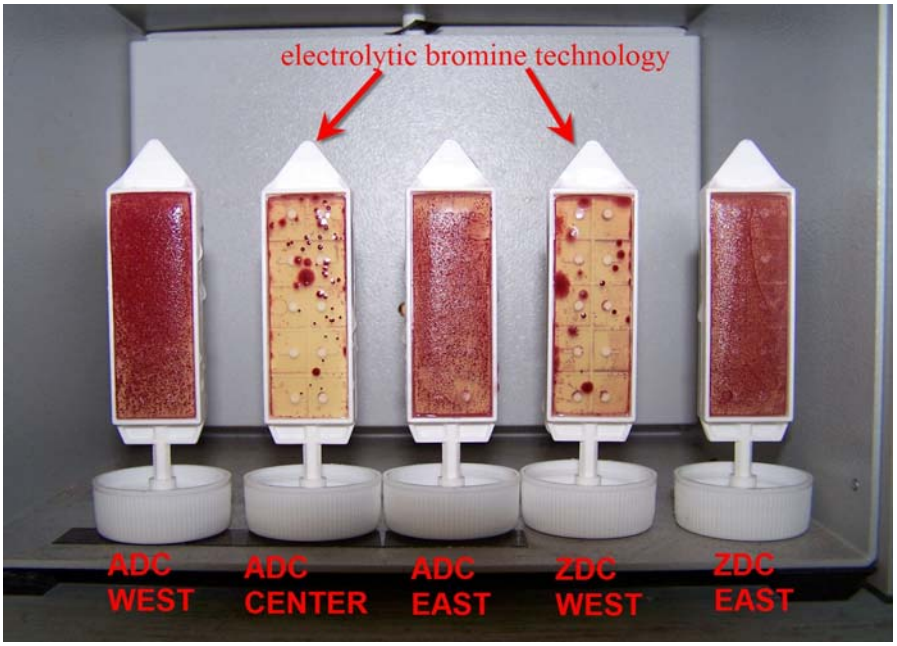
We suggested in March, 2007, that the organic biocides could be totally replaced by electrolytic bromine generated on-site using a patented ElectroBrom unit. Based on an initial sampling, we suggested trial installation of a Model EB-4, capable of producing up to 4 lb/day of bromine. The plant agreed to the trial proposal and a Model EB-4 was delivered and installed with start-up around July 1, 2007. Use of organic biocides was discontinued and after some experimentation the system was deemed to be in excellent biological control with a daily three hour dose of electrolytic bromine.

Results were deemed so good that a second electrolytic bromine unit was ordered for another 8,000 gallon volume cooling tower system, "ADCC". This second unit, a MiniBrom MB-2.5 capable of generating 2.5 lb/day of bromine, was delivered and installed in early October, 2007.

ElectroBrom patent #7,927,470

Results

The cooling tower system operators run a weekly biological dip slide on each of the five installed cooling towers, the following picture was taken of the December 3, 2007; dip slides, which provide a good results comparison between the electrolytic bromine and organic biocide treated cooling tower systems. – photo provided by customer-



Concern has been expressed about increased corrosion rates from use of electrolytic bromine. To determine if there was any corrosion problem related to the first EB-4 installation in the ZDCW system, a 95 day corrosion coupon study was carried out by the plant cooling system operators with the following results obtained:

steel C1010 – 0.23 mil/yr copper CDA 110 – 0.02 mil/yr brass CDA 260 – 0.01 mil/yr

These corrosion rates are considered to be excellent, showing that routine operation of the ElectroBrom has not caused a high corrosion rate on common materials of construction.

Total use of the electrolytic bromine precursor, PCT 3024, from start-up through December, 31, 2007, totaled 1150 lbs. At a list price of $1.05/lb, the maximum cost for treating two systems for over three months was $1,207.50. In comparison, just the ZDCW cooling system would have consumed over $3,600 worth of organic biocides in the same time period, with poorer results.