ProMoss™
CASE STUDY

Data Center Chilled Water Closed Loop

Promoss Improves The Performance At A Data Center

Keeping a data center cool is no easy task, but when the chilled water system at this New York City facility began underperforming due to bacteria buildup and murky water, the operators knew they needed to take action. The traditional chemical treatments were falling short.

Tower Water and Creative Water Solutions worked with the facility to implement a new system using ProMoss technology—an all-natural water treatment system derived from sustainable Sphagnum moss.

Since installing ProMoss, the data center has seen steady improvements in clarity and control of organic contamination within the chilled water system. This eco-friendly green solution now keeps the facility operating at peak efficiency, overcoming limitations that standard water treatments could not.

APPLICATION

The system is a 24/7 year-round redundant chilled water system with lead-lag air handlers and multi-stack chillers. The system was being treated with corrosion inhibitor and intermittent dosages of non-oxidizing biocide with a 10-micron pleated bypass filter. The total system volume for this closed loop is 1,500 gallons.

THE CHALLENGE

The system was experiencing several operational issues due to shortcomings in the existing water treatment program:

- Increased energy usage due to strainer contamination and biofilm buildup.
- Reoccurring elevated bacteria levels, regardless of biocide additions, upon switching redundant stagnant equipment.
- Elevated levels of metals.
- Increased frequency of filter cartridge change-outs
- Inconsistent water clarity and turbidity levels.
- The system required flushing and retreatment biennially to remove biocide byproducts

GOALS

The introduction of ProMoss aimed to improve system performance in several areas:

- Reduce bacteria counts consistently below 10cfu.
- Reduction and stabilization of metal levels in the system.
- Improved water clarity (turbidity levels less than 5ntu's).
- Reduce the need to completely flush and retreat the system biennially.
- Implement a green solution that does not add toxic chemicals to the sanitary sewer.

APPROACH

ProMoss was added to the closed loop system, in recommended dosage, in place of system filter. The cooling operation design was not altered, and corrosion inhibitor remained online.

- System monitored and tested monthly using comprehensive water quality parameters and system data.
- ProMoss changed out on a monthly interval.
- Corrosion coupons monitored and changed on a 90-day basis.

CORROSION CONTROL

Corrosion levels were expected to remain within expected industry standards. ProMoss has had a positive effect on the copper and steel corrosion levels during the entire study. No pitting occurred in any coupon.

After 90 Days

0.030 mpy

0.018 mpy

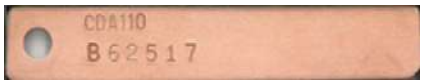
After 180 Days

0.181 mpy

0.000 mpy

After 270 Days

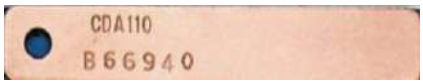
0.163 mpy



0.013 mpy

After 1 Years, 7 Months

0.0049 mpy



0.0048 mpy

After 1 Years, 9 Months

0.0033 mpy

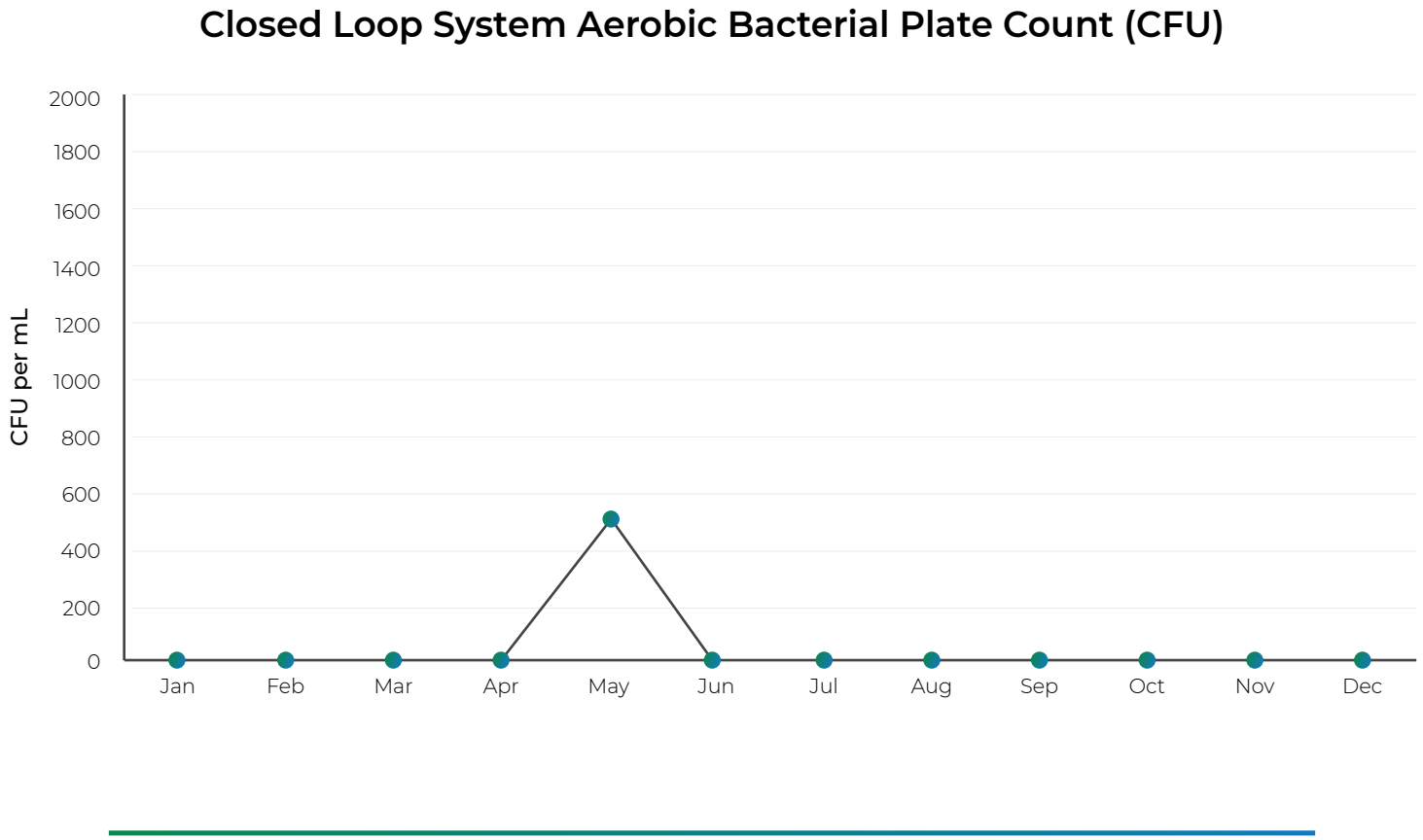
0.0026 mpy

DESCRIPTION	CARBON STEEL	COPPER ALLOYS
Excellent	Less than or equal to 0.2	Less than or equal to 0.1
Good	0.2 to 0.5	0.1 to 0.25
Moderate	0.5 to 0.8	0.25 to 0.35
Poor	0.8 to 1	0.35 to 0.5
Very poor to severe	Greater than or equal to 1	Greater than or equal to 0.5

Classification of Corrosion Rates for Closed Recirculating Cooling Water Systems (Corrosion Rates, mpy)
Source: Bennett P. Boffardi, Ph.D., FNACE. "Standards for Corrosion Rates", AWT Analyst, Spring 2000

ANNUAL CHART OF BIOLOGICAL ANALYSIS

Previous results show an inability to control bacteria due to alternating equipment and lack of biocide reaching all system parts. Once ProMoss was introduced, the system stabilized, showing very little activity.



THIRD-PARTY CONSULTANT REMARKS

"A review of the service reports indicates Tower Water is doing an excellent job of maintaining the system. The on-site analysis indicates the biological issues are under control and the chilled system is in good shape. Compliments to Tower Water Management for maintaining good water treatment chemistries (program)."

RESULTS

- Level of bacteria remained below 10 CFU.
- Achieved a satisfactory reduction of iron and copper levels in system.
- Corrosion study shows better results with ProMoss than with chemical treatment alone.
- Overall cleanliness of the water was improved.
- Turbidity reduced with addition of ProMoss from 17 NTU to 0 NTU.
- There were no adverse conditions, filming, or need to pull and clean the unit strainers. All temperatures and pressures have remained normal over the past year, as noted by the mechanical contractor.
- No need to drain or flush system throughout the duration of trial.
- No biocide was added to this closed loop throughout the duration of the trial.

CONCLUSIONS

The 12-month ProMoss trial yielded positive results across key chilled water system performance metrics. Compared to traditional biocide treatments, the ProMoss system reduced bacteria counts by over 90% while lowering corrosion rates to within target thresholds. Operational benefits included improved water clarity for easier inspection and eliminating flushing requirements.

From a sustainability standpoint, implementing a ProMoss-based treatment and filtration process allowed the transition away from harsh chemical biocides with no sacrifice in microbial control or corrosion inhibition over the year-long test period.

With third-party validation verifying environmental and operational impacts, these findings indicate that ProMoss technology could provide a viable treatment alternative for reducing a facility's chemical footprint without hampering chilled water quality or equipment reliability.

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