



## Case Study

### The Problem: Super Computer Data Processing CPU Performance Loss

#### Cause of Problem - Biofouling

Today's Big Data reality depends on real world cooling efficiency. Even a super thin biofilm and/or deposits of any kind, cause real world cooling computer efficiency issues which cost real world dollars.

Heat transfer needs for today's cpu's are the bottle necks for any and all data process and transfer speeds. This system was a computer data processing center in the western United States, called a super computer. The problem was that the new cpu's speed was throttled back due to the thin layer of organic deposition (biopolymers) that formed in the cooling water.

The data processing system consisted of hundreds of feet of 1/2 inch to 3/4 inch tubing and piping for cooling water distribution. It also contained dozens of "quick disconnects" that provided various "nooks and crannies" in the system along with dozens of key distribution points designed with 90° angles. To make this more "interesting", there was complete lack of visual inspection points in the system.

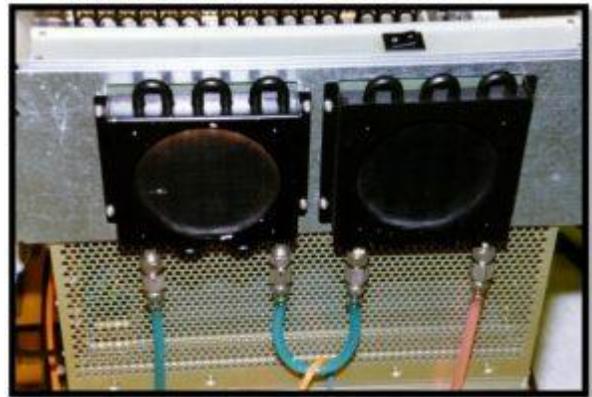
#### The Solution

These folks elected real time or on-line cleaning as compared to shutting the operation down. This is referred to as CIP (clean in place). Due to the nature of the on-going "work" being done, there was no option for PMS (preventative maintenance service) shutdown. Thus, with the cleaning process being performed online or "live", this was a perfect fit for the AMSA, Inc. solution.

Therefore, AMSA Inc. technology was chosen for the live (online) clean-out program and, once clean, for the "keep it clean" maintenance program. AMSA, Inc. chemistry is an excellent fit for a "live" clean-out, as the chemistry is solvent-free (water based).

#### Results

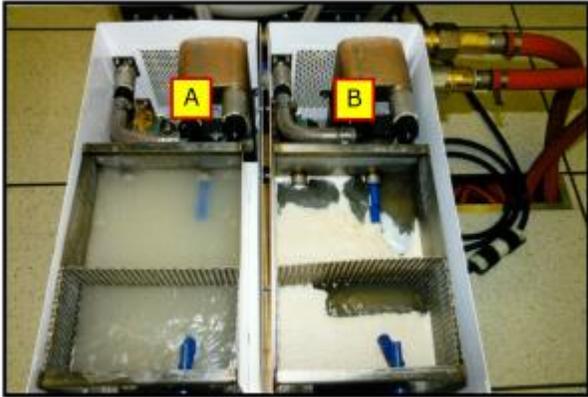
The small heat exchangers pictured below were used to cool the water that controlled the temperatures of the computers.



This picture shows a side by side sump system. Side A is covered and side B is open. The water in the sump is visually dirty.



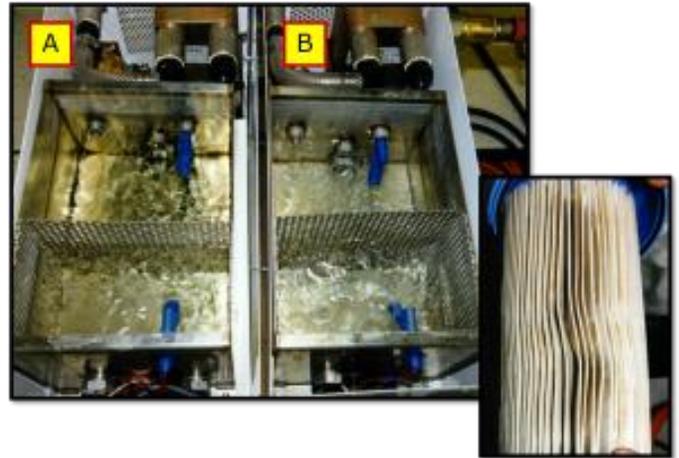
The side by side sumps were dosed with BCP™ 2430. The sump on the left (A) looks turbid, murky and gray, just after dosing. This is the typical appearance just after dosing BCP™ chemistry. In most cases, deposit removal is visually observable in minutes. The sump on the right (B) shows a structured foam or slurry; clearly, the “gunk” is in the process of being removed, and floated.



The resultant slurry carries organic deposits (“gunk”) and inorganic debris that is loosened or “disaggregated” in the BCP™ chemistry’s cleaning process. The “good foam” dissipates back into the water. This mode of action, is very unique, in its ability to “return” to the bulk water. With this ‘return’ mechanism, any active ingredient is returned or recycled so the chemistry can do its job again, in a repeated cycle. In short, the chemistry is re-released in the system to do more cleaning. The floating deposits, if any, can be removed through filters and/or by blowdown. Since the sessile or surface attached foulants are emulsified, the issue of plugging small openings is not an issue.

This system showed a remarkable level of cleanliness in just 30 minutes. The in-line filtration system (an example of the filter used is pictured here) removed the released deposits rapidly.

As these pictures document the cooling water system was quickly cleaned up with AMSA BCP™ 2430 chemistry. A 90% drop in ATP counts verified the visual evidence of cleaning. The unique action of AMSA chemistry penetrates organic deposits and releases them from system surfaces. In this case, the BCP™ 2430 treatments combined with an aggressive filtration system resulted in a very clean cooling water system in a short time period.



Once a system is cleaned, AMSA BCP™ chemistry can be used in a maintenance dosing program. Dosing BCP™ 2430 along with some periodic treatment of oxidizing or non-oxidizing biocide will keep cooling water systems clean. As data centers require clean water cooling systems to maintain maximum cooling efficiency, AMSA BCP™ chemistry is the perfect adjunct to cooling water treatment programs in data processing centers!