



## Ambient Water Treatment Consulting, Inc.

Water Treatment Monitoring  
Cooling and Boiler Water Analyses  
Water Treatment Bid Evaluations  
Equipment Inspections  
Pipe Analyses

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## THE EFFECT OF COOLING TOWER MAINTENANCE ON THE SUCCESS OF A WATER TREATMENT PROGRAM

A great deal has been written on the subject of open cooling tower water treatment; however, the subject is often addressed on a very technical level involving the maintenance of an exacting chemistry balance. While maintaining the desired water chemistry is critical to achieving good corrosion and biological control, it alone cannot overcome the burden of a deposit-laden cooling tower. Maintaining clean, wetted surfaces is the bedrock of a good water treatment program. The best possible chemistry cannot reduce corrosion or biological fouling if the treated water cannot contact the metal surfaces that are hidden beneath deposits.

Water treatment programs are generally monitored by measuring chemical and biological parameters and corrosion coupon results. These measurements only indicate the condition of the bulk water and not the condition at the pipe wall and heat transfer surfaces. The corrosion coupons are generally subjected to flow of three to four feet per second in a corrosion coupon rack fabricated from 1-in pipe. This flow rate, while consistent with industry standards for measuring corrosion, does not simulate the low-flow scenario that encourages deposits and biological growth. Furthermore, typical biological monitoring is limited to the use of bioassay slides that only indicate planktonic (floating) bacteria levels in the circulating water. Sessile (surface) bacteria can be far more dangerous to system metallurgy by accelerating localized, pitting-type corrosion.





Deposits generally form at areas subject to low or intermittent flow such as cooling tower basins, cooling tower equalization lines and horizontal pipe runs. The deposits harbor bacteria that can add a burden to the biocide program and ultimately undermine the corrosion control program.

Given the potential problems caused by deposits, the following steps should be considered to reduce the potential for system deposits and corrosion.

### **Cooling System Maintenance Tips**

- Consult the cooling tower operations manual provided by the manufacturer for maintenance instructions for the tower design in use.
- Consult the water treatment supplier for recommendations.
- Install sidestream sand filtration typically sized for 2% to 5% of the circulation rate. Filters should be of the high-efficiency type capable of removing sub-micron particles. Inspect the filter beds and perform a filter efficiency study annually.
- Blowdown all low-flow or no-flow pipe runs including dirt legs, risers, equalization lines and condenser heads. Remove dead legs if possible.
- Expose all pipe section to flow by balancing equipment use. Exercise all distribution valves.
- Limit the cooling tower water from exposure to direct or indirect sunlight by covering distribution decks.
- Redirect any building exhausts and vents away from the cooling tower.
- Install walkways around the cooling tower to facilitate inspection and cleaning of the tower basin.
- Clean the tower and disinfect the system before system start-up and shut down if seasonal.





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- Inspect the cooling tower basin at least weekly. Clean the basins when visible dirt and algae are present. Be careful not to sweep the dirt into the tower suction line by covering the suction box.
- Schedule a thorough system flush and physical cleaning of the cooling tower at least twice per year and disinfect the tower using an oxidizing biocide. More frequent cleaning may be needed based on site-specific conditions.
- Increase cooling tower inspection and cleaning frequency if construction is taking place in close proximity to the tower and during the seasonal changes when wind borne debris levels increase (pollen and seeds for example).

Maintaining clean system surfaces is a major step in extending the life of critical plant equipment, improving heat transfer and in reducing the potential for the amplification of *Legionella*.

**Ambient Water Treatment Consulting, Inc.** is a full-service consulting firm staffed with water treatment professionals who are dedicated to providing you with **unbiased, independent information** on the state of your critical heat-transfer equipment. **We do not sell treatment products.** We perform a variety of testing and inspection services that determine the effectiveness of your existing water treatment program.

Since 1998, we have provided essential services to some of the best-known property management firms in the country, as well as health care facilities, data centers, museums and industrial complexes.

For more information on this subject and for answers to all of your water treatment questions, please visit our website [www.awtconsulting.com](http://www.awtconsulting.com) and/or contact us at:

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