

Foaming Cooling Tower

By James McDonald, PE, CWT

You walk into work one day and see white tufts of foam shooting out the top of your cooling tower and floating down onto the nearby cars and equipment. The Plant Manager calls you into his office and says, "Make it stop before I get complaints and bills for car washes and new paint jobs!"

Foaming Causes

There are multiple reasons for a cooling water to foam. The water in the cooling tower may have one or a combination of these causes at work. Causes for cooling tower foaming can include:

- Chemical overfeed
- Over cycling
- Excessive suspended solids
- Protein byproducts from microbiological growth
- High alkalinity
- Process contamination, and
- Surfactants

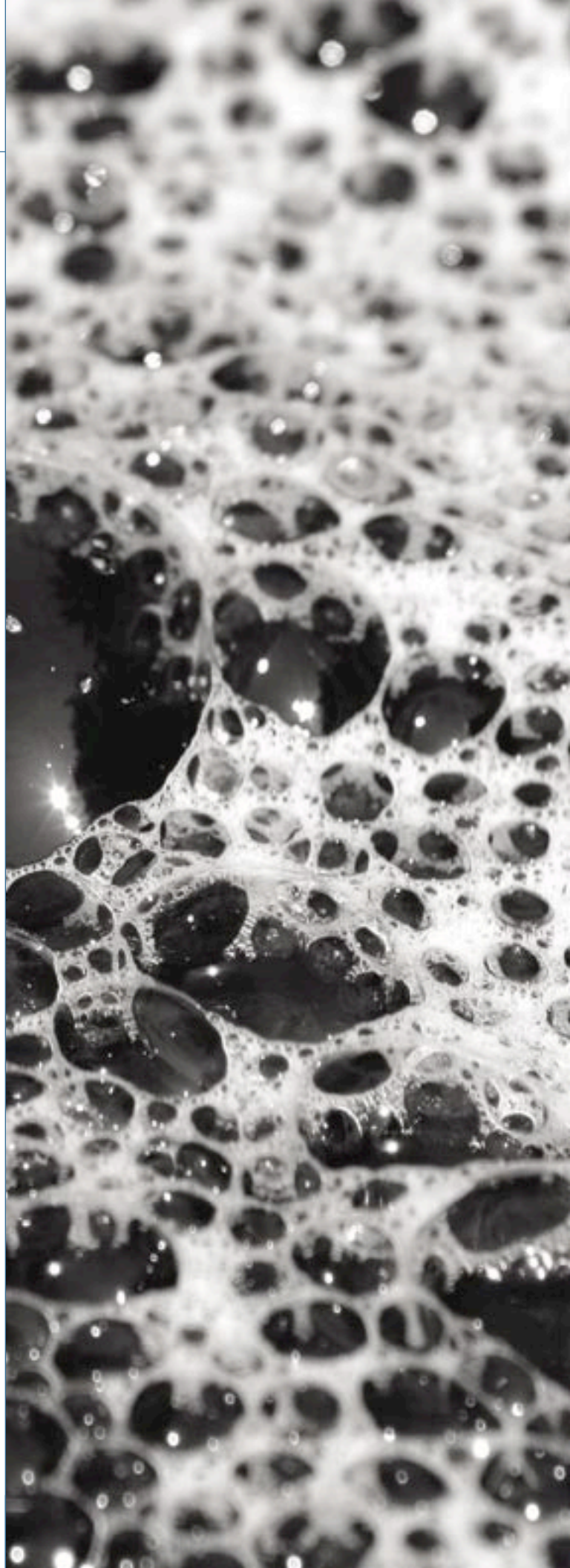
Chemical Overfeed

Overfeed of biocide or treatment chemicals can cause foaming. Reduce the chemical feed, blow down the cooling tower water, and add an antifoam if necessary. It usually requires a small amount of antifoam to reduce or eliminate the foam. Be careful not to add too much antifoam because this can also cause foaming. If you do not have any available antifoam, use WD-40®, which has antifoam properties. Be aware that WD-40® will add oil to the system.

Over Cycled

An over cycled cooling tower can foam. Blowdown the system within the control parameters.

continued on page 73



Excessive Suspended Solids

Excessive suspended solids in a cooling tower due to nearby construction, a nearby dirt road, grain unloading, a dry summer, etc. can cause foaming in the cooling tower. Remember that cooling towers act as air scrubbers too. Any dirt in the air will eventually end up in the cooling tower water. Eliminate the source of the suspended solids, blow the system down, or use an antifoam.

Protein Byproducts from Microbiological Growth

If the tower has excessive microbiological growth, their waste and decomposition byproducts can cause “protein foam” in the cooling tower. Also, if the tower uses an intermittent biocidal feed instead of a continuous feed, the decomposition products during these biocidal events can cause “protein foam” in the cooling tower. Re-evaluate the biocide program and use an anti-foam if necessary.

High Alkalinity

High alkalinity in cooling tower water can cause foaming. This can be especially true when softened non-degasified reverse osmosis permeate is used as makeup to the cooling tower. Because the reverse osmosis permeate is soft water, it is possible to operate at higher alkalinity levels; however, higher alkalinity can cause foaming. Re-evaluate the control parameters and increase blowdown if necessary to reduce foaming.

Process Contamination

Process contaminants such as oil can cause foaming in the cooling tower. Eliminate the contamination, blowdown the cooling tower to remove the contaminant, and use an anti-foam if necessary.

Surfactants

Often times cooling tower sumps are located in the floor of a facility. If the floors are washed down with detergents, these detergents can drain into the sump and cause foaming. Also, never rule out the possibility that someone has simply poured a bottle of soap into the system. In an industrial setting this is probably not a possibility, but in a commercial or college setting it may be possible. Remove the surfactant if possible, blowdown the cooling tower water, and use an antifoam if necessary.

Conclusions

Foam in a cooling tower can have many causes and is the end result of other problems that need to be addressed. Cooling tower foaming can damage nearby equipment, ruin paint on cars, and may even be an inhalation source for Legionella bacteria. The “big picture” when dealing with a foaming cooling tower is as follows, but will be unique for each system:

- Return the cooling tower to normal operating parameters
- Eliminate the source of the foam
- Blowdown the system to remove foam-causing contaminants
- Apply antifoams/defoamers as required ♦

James McDonald, PE, CWT, is technical support, engineering and MIS Director for Crown Solutions, Inc. He can be reached by phone at (937) 890-4075, or by email at jmcdonald@crownsolutions.com

These are certainly not all-inclusive, but they can get you well on your way to getting your workers’ compensation costs lowered or more under control.

And, one final word on costs. Workers’ compensation benefits are provided by an insurance carrier (if not self-insured). You as the employer have a great deal of input into the policy, the premium, the working relationship with the adjusters, and often, the final say in how a claim is to be handled. You need to know how the process works in your state so you can control, monitor, track, and ultimately, save on your costs while ensuring your employees receive all of the benefits they are to get should an at-work injury occur.

Workers’ compensation costs must be proactively handled the same as your production, inventory, and payroll costs. If you and your employees understand the nature of how workers’ compensation programs work, everyone can work together for positive results. ♦

Randy DeVaul has 25 years in safety and emergency services. He’s authored “Performance Safety: Lessons For Life” and two other safety books. His background includes regulatory, corporate, and industrial settings in human resources and safety, including extensive workers’ compensation experience. He is a national consultant, speaker, and internationally published writer. Comments are always welcome at safetypro@comcast.net.

Note: part of this article originally published in Occupational Health & Safety, 8/05. Reprinted with permission.