

This article was originally published in the October 2012 issue of The Synergist[®], the magazine of the American Industrial Hygiene Association[®].”



SAFETY

IH and *Legionella*

ASHRAE's Pending Standard and Industrial Hygienists' Potential Role

BY MATTHEW R. FREIJE

News stories like “Legionnaires’ disease outbreak kills 2 at Chicago hotel” (CNN, Aug. 28, 2012) and the bad word-of-mouth that ensues can devastate businesses. Some hotels have shut down permanently following an outbreak.

The lawsuits that often follow take a major toll as well. Settlements can run in the millions. Testifying in depositions and complying with requests for documents takes employees’ time and is emotionally draining. Fees for attorneys and expert witnesses aren’t cheap, either.

Legionnaires’-related lawsuits are not uncommon, in part because the disease is entirely environmental, caused not by person-to-person transmission but by exposure to *Legionella* bacteria transmitted from water in plumbing systems, cooling towers, whirlpool spas, or other building water systems. If insurance companies are successful in not paying *Legionella* claims, which some have already attempted under exclusions for bacteria, then the out-of-pocket costs for building owners will be even higher.

Worse than loss of business and lawsuits are the lives affected by Legionnaires’ disease. According to the Centers for Disease Control and Prevention (CDC), the disease can be fatal in up to 5–30 percent of cases.¹ The percentage is even higher among high-risk persons like hospital patients and nursing home residents. And many who survive have lingering symptoms, including neurological problems that can be permanent in some cases.²

Significance

This is why pending ASHRAE Standard 188, *Prevention of Legionellosis Associated with Building Water Systems*, is so important. Although *Legionella* has been studied far more than any other waterborne pathogen in the 36 years since Legionnaires’ disease was discovered, and even though evidence-based preventive measures have been discussed in guidelines, industry articles, and conference presentations, many building operators are still unaware of preventive measures, and even fewer are



properly implementing them. ASHRAE 188, which is scheduled to be finalized late this year, aims to change that. If properly implemented, the standard will affect the way water systems are managed in hundreds of thousands of buildings in the United States.

(Note: I am not a member of the ASHRAE 188 committee. My company provides training, consulting services, and publications on the control of *Legionella* and other waterborne pathogens. For more information about the standard, refer to www.ashrae.org.)

If government and industry guidelines outlining *Legionella* control measures in building water systems already exist, what makes ASHRAE 188 such a big deal? First, ASHRAE 188 will carry more weight than a guideline and will be written to become a regulation-ready ANSI standard. Second, the 188 draft is the first *Legionella* document in the U.S. to have such broad support among government agencies, industry groups, and *Legionella* experts.

Requirements

The core requirement of the pending standard is the Hazard Analysis and Critical Control Point (HACCP) approach in the management of plumbing systems, cooling towers, decorative fountains, whirlpool spas, air washers, misters, and humidifiers.

The latest draft of the standard requires a HACCP water plan for buildings like hospitals and nursing homes that have occupants at above-average risk of contracting Legionnaires’ dis-

ease; and for office buildings, apartment buildings, hotels and other buildings that have ten or more stories, centralized water heaters, or an incoming water supply with a chlorine concentration of less than 0.5 ppm.

The HACCP process wasn't invented by ASHRAE. It has been used for years in the food industry and, since 2007, has been recommended by the World Health Organization in managing building water systems for the control of *Legionella* bacteria.

Developing and implementing a *Legionella* HACCP water plan boils down to identifying points and processing steps for all building water systems, establishing control measures at critical control points, verifying that the control measures are implemented within specific performance limits, and validating that the plan is effective in preventing Legionnaires' disease.

Responsibility for compliance will fall primarily on building operators but will also affect architects, engineers, contractors and water treatment companies.

Roles for Industrial Hygienists

Industrial hygienists can possibly play several roles in the development and implementation of a *Legionella* HACCP water plan. Here are a few significant actions that IHs can take:

Inform your clients or employer. Industrial hygiene consulting firms should inform their clients that a water management plan incorporating HACCP principles for the control of *Legionella* has been recommended by the World Health Organization since 2007 and is required in ASHRAE's pending *Legionella* standard, even if the consultant will not be offering services related to a *Legionella* HACCP plan. The client might rely on—or, after a case of disease, claim to have relied on—the IH firm to advise it about the need for a plan.

If you are employed by an organization occupying a building that requires a HACCP plan because of one of the risk factors outlined in the pending ASHRAE standard, then you should inform your employer of the need to implement a plan.

Perform water systems surveys. An inventory of a building's water systems is one of the first steps in developing a *Legionella* HACCP water plan. This is not an inspection to identify or solve *Legionella* problems, or to assess the condition of water systems, and thus does not have to be performed by a *Legionella* expert. Any person familiar with water system components can do a survey for the purpose of developing a *Legionella* HACCP water plan because the objectives are simply to identify points and processing steps in the water systems—from the public water main taps to the points of use.

In an industrial facility, for example, you would identify where the water is fed into the campus; where it enters buildings; where it's softened, heated, or otherwise processed; and the types of devices (such as faucets, showers, and emergency showers) at points of use. Although most facilities have personnel who are capable of doing the survey, some facility operators will choose to hire an engineering firm, water treatment company, or consulting firm to do the survey for them. Industrial

hygienists would then have an opportunity to earn a fee providing a needed service.

Test water for *Legionella*. The facility's HACCP team must choose one or more methods to validate the effectiveness of the HACCP plan. Validation does not pertain to particular steps or control measures but to the overall effectiveness of the plan in accomplishing its purpose: to prevent Legionnaires' disease by reducing the hazard (*Legionella* bacteria).

One validation method—though weak by itself—could be to cite studies showing that *Legionella* was less prevalent in similar water systems after implementing control measures like the ones in the HACCP plan. Monitoring cases of facility-acquired Legionnaires' disease is another possible validation method but practical only in hospitals and some nursing homes.

For most facilities, testing the building water systems for *Legionella* will be the surest way to validate a *Legionella* HACCP water plan since it involves direct monitoring of the hazard in question. The test results will help determine whether the control measures are adequate.

If the HACCP team chooses to validate its plan by testing for *Legionella* routinely, it must outline a sampling program that provides useful data and properly interpret test results—otherwise it will likely get unreliable test results, act on the results inappropriately, or both. The team will need to decide how often to sample, what to sample, how many samples to collect each round, and the types of samples to collect (for example, pre-flush versus postflush, hot versus cold, water versus swab). The laboratory selection is especially important because *Legionella* culture is highly specialized.

The Value of ASHRAE 188

Over the next few years, number-crunchers will probably debate the value of ASHRAE 188 by comparing the cost of implementing it with the savings realized from reduced health care and litigation costs associated with Legionnaires' disease. In my opinion, no matter which way the dollars tip the scales, the pending standard will be a winner because of the lives it protects. Industrial hygienists have an opportunity, and perhaps a responsibility, to contribute to that effort. 🛠️

Editor's note: Parts of this article were excerpted from an online training program written and narrated by the author.

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References

1. CDC: "Patient Facts: Learn More about Legionnaires' Disease." Available at www.cdc.gov/legionella/patient_facts.htm.
2. "Health-Related Quality of Life and Posttraumatic Stress Disorder among Survivors of an Outbreak of Legionnaires Disease." *Clinical Infectious Diseases* 35:11–17 (2002).