WATER TREATMENT NEWS

New Standards Provide Guidance in Legionella Control

Volume 43
Spring 2011

Since Legionnaires Disease (LD) was first identified in 1976 as a disease apart from ordinary pneumonia, much debate has occurred regarding the source of transmission of the disease and the procedures and practices that building operations personnel should put in place to reduce the risk of an outbreak or occurrence of the illness in their facility. There is little if any debate, however, over the fact that the potentially deadly disease strikes more frequently than was earlier believed.

The Centers for Disease Control and Prevention (CDC) estimates that cases of LD occurring in the United States each year number as high as 20,000. Others suggest that the numbers are even higher, as many cases may be reported as regular pneumonia. All agree, however, that every effort should be made to reduce the occurrence of Legionnaires disease in public buildings.

A large number of cases of Legionnaires disease are nosocomial, or healthcare facility acquired. Most of these occur among susceptible groups of hospital populations, including cancer patients and other immuno-suppressed groups, the elderly and others with respiratory ailments. A large percentage of nosocomial Legionnaires cases occur when the victims aspirate Legionella-containing domestic water and breathe contaminated water droplets deep into their lungs, where the bacteria grow, multiply and cause the infection.

Volume 5 of *The Water Treatment News* discussed nosocomial Legionnaires disease; this issue looks at "community-acquired" Legionnaires disease, most occurrences of which occur in public buildings through inhalation of LD-contaminated mist from cooling towers and other aerosolizing devices.

Whirlpool spas, decorative fountains and even grocery store vegetable misters have been identified as sources of community-acquired Legionnaires disease, but cooling towers likely account for the largest number of community-acquired cases, due to the nature of their operation. LD infection from spas, fountains, misters and other similar devices requires close proximity of the victim, as the aerosol spreads only a short distance before it disperses. LD-contaminated drift from a cooling tower, on the other hand, can travel long distances and can cause Legionnaires disease several blocks from the tower site, or, if the tower is located close to the air intake of a building, contaminated drift from the tower can cause occurrences of the disease among building occupants.

To address the threat of Legionnaires disease in public buildings, the American Society of Heating, Refrigerating and Air-conditioning Engineers

This Newsletter courtesy of:
CHEMTEX
INTERNATIONAL CHEMTEX CORPORATION
8287—214th Street West ·Lakeville, MN 55044
952.469.4965

(ASHRAE) published Guideline 12-2000, "Minimizing the Risk of Legionellosis Associated with Building Water Systems." The Guideline presented practices and procedures for building owners and operators to follow for Legionella control in their facilities. ASHRAE put the guideline out for public review in the fall of 2010 and addressed comments and recommendations for revisions in January 2011. They are conducting a second public review this spring, hoping for final approval of the guideline as Standard 188 later this year.

Standard 188 will first require a public building to be surveyed to determine its risk characterization, which is a qualitative estimation or assessment of the risk of an occurrence or outbreak of Legionnaires disease associated with the building and its water systems. Based on the risk characterization, the facility management or building owner must comply with measures intended to reduce the risk of Legionnaires disease by minimizing the possibility of the building occupants' contact with Legionella bacteria.

The first step involves assigning a person or persons to be responsible for conducting the building survey. These personnel will survey the building to identify the presence of any of the following risk factors:

- Cooling towers and/or evaporative condensers
- Whirlpool spas
- Decorative fountains in the building or on the grounds
- Spray humidifiers or other aerosol-generating devices
- Recirculating hot potable water systems, if any of the following apply:
  - Multiple housing units with centralized hot water heaters
  - Building greater than 10 stories
  - Total halogen concentration in incoming water less than 0.5 mg/l

If one or more of these risk factors are present, the facility owners or management must implement a program called Hazard Analysis and Critical Control Point (HACCP). To begin this process, an HACCP team must be formed. This team should be comprised of members from each of the following groups, as applicable to the facility:

- Administration or management
- Operations or engineering
- Risk management or safety
- Infection control
- Water treatment company responsible for the cooling water treatment program
- Legionella microbiologist (laboratory certified for Legionella testing)

Standard 188 will require that at least one of the team members be trained in HACCP.

When the team is assembled, they will need to:

- Conduct a detailed hazard analysis
- Determine critical control points (CCP), or places to control the hazard
- Establish critical limits for each control point
- Establish a system to monitor the control of each CCP
- Establish the corrective active action to take when monitoring shows that a CCP is not under control
- Establish procedures to verify that the HACCP process is working
- Establish documentation to record procedures and outcomes of the HACCP process

HACCP is a management system originally developed for and extensively used by the food industry in which food safety is addressed through the analysis and control of biological, chemical and physical haz-

ards throughout the process of production, procurement, manufacturing, distribution and consumption of food products. It proved to be successful in helping establish, refine and audit safe food production and distribution practices. Based on its success in the food industry, the system was adopted by other industries such as cosmetics and pharmaceuticals. ASHRAE, understanding that HACCP is well-adapted to the task of minimizing the risk of Legionella infection from building water systems, requires its use in Standard 188.

While ASHRAE's Legionella documents offer much detail on the personnel recommended to be included on the HACCP team and the processes the team should employ in determining their building's risk assessment, it provides little or no detail in recommendations for actually controlling Legionella bacteria. ASHRAE will provide some of that detail in Guideline 12-2000, which is being updated.

The Cooling Technology Institute (CTI) has produced a document that presents more detailed recommendations for Legionella control in cooling tower systems. In July 2008, CTI published "Legionellosis Guideline: Best Practices for Control of Legionella." This document will be followed by CTI Standard 159 – "Legionellosis Related Practices for Evaporative Cooling Tower Systems." These publications make recommendations for operational procedures designed to control the growth of Legionella bacteria in cooling tower systems.

The 2008 CTI guideline states their recommended "best practices and recommendations for minimization of risks associated with Legionella." CTI purports that these measures "….can be effective in fostering the safety of cooling systems. This is accomplished directly by destruction of planktonic (free-swimming) bacteria including Legionella, and indirectly by eliminating conditions that favor Legionella amplification (multiplication), i.e. the elimination of biofilms and amoebae and other protozoa on biofilms and which serve as Legionella hosts."

To accomplish this, CTI recommends focusing on chemical control of Legionella and other microbes, with halogens, including "chlorine gas, hypochlorites, chlorine dioxide and stabilized halogen donors serving as the primary disinfectants. They add that biodispersants or biofilm cleaners can "aid in penetration, removal and dispersion of biofilm and often increase the efficacy of the biocide."

To help assure the success of the program of chemical control of Legionella in the tower system, CTI recommends monitoring of the system to include:

- Visually inspect tower regularly – deck, fill and basin
- Eliminate, if possible, stagnant water areas
- Eliminate controllable sources of nutrient to the cooling water system
- Maintain overall system cleanliness
- Use the best drift elimination technology available
- Regularly monitor bulk water planktonic and sessile (attached to surfaces) microbial populations
    - Recommended monitoring techniques include the use of dipslides or other culturing techniques and ATP-based biomonitoring
- Maintain records of treatment feed, monitoring results and remedial action taken

The CTI recommendations, then, provide effective steps for control of Legionella in

cooling tower systems, but don't address control in whirlpool spas, decorative fountains, spray humidifiers or other aerosol-generating systems. However, many of their recommendations for cooling tower systems – specifically, eliminating, if possible, stagnant water, eliminating controllable sources of nutrients, maintaining overall system cleanliness, regular monitoring of microbial populations and record-keeping, are excellent actions to take in other systems that could serve as sources of transmission of Legionnaires disease.

No program for Legionella control can *absolutely* guarantee that an outbreak or occurrence of Legionnaires disease will not occur. However, by following the recommendations of both the ASHRAE and CTI guidelines and standards, where applicable for his facility, the building owner or operator will go a long way toward protecting his building's occupants, visitors and others in the vicinity from contracting the disease. While implementing these procedures requires time and expense, they are resources well-spent in protecting both the population from illness and his bottom line from the costs of remediation, litigation, negative publicity and other ill effects of Legionnaires disease.

Are your building's water systems safe?

Ask Chemtex to help you design a program to protect your building and the people that use it!