

HETI Horizons

The Need For *Legionella* Water Management Plans

Legionella is a bacterium that causes a type of serious lung infection known as Legionnaires' disease. According to the Centers for Disease Control and Prevention (CDC), health departments reported approximately 6,100 cases of Legionnaires' disease in the United States in 2016. Unfortunately, about 10 percent of people diagnosed with this disease will die – with the majority of fatalities occurring among the elderly and those with compromised immune systems. *Legionella* thrives in a narrow temperature range that includes the human body temperature. And since the symptoms of Legionnaires' disease are similar to other illnesses, it is likely underdiagnosed and the true number of cases underestimated by the CDC. Due to the large number of *Legionella* cases each year and the resulting personnel and economic costs, *Legionella* water management programs are now an industry standard for large buildings in the U.S.

Common Sources of *Legionella*

Legionella is found naturally in freshwater environments, like lakes and streams, but generally the low amounts in freshwater do not lead to disease. *Legionella* can become a health problem in building water systems when it multiplies and becomes aerosolized into small droplets that can be breathed in by facility occupants. Outbreaks occur most often during the warmer summer months, when buildings start air conditioning systems that have been turned off for long periods. Buildings with increased risk for *Legionella* growth and spread include healthcare facilities, buildings with more than 10 stories, retirement homes, assisted living facilities, hotels, and high-rise apartment buildings. Outdoor water parks, fountains and other water features are susceptible to bacterial growth as well. *Legionella* grows best in building water systems that are not well maintained. Building water system components often associated with *Legionella* growth and spread include cooling towers, hot tubs or spas, decorative fountains, central humidifiers, sink faucets, and shower heads. Keeping *Legionella* out of building water systems is key to preventing the occurrence of infections among building occupants.



Elements of a Water Management Program

Development and maintenance of a water management program require continuous oversight and several key steps – including:

- ◆ Forming a water management program team. Typical members could include building owners, building managers/administrators, facility maintenance/engineering employees, Certified Industrial Hygienists, water treatment consultants, microbiologists, and state or local health officials.
- ◆ Documenting the current building water system components using text and flow diagrams. This would include information on the water supply source, water distribution methods, water heating methods, and diagrams that link the flow of water among these components.
- ◆ Listing areas in the building water systems where *Legionella* could grow and be distributed. The previously developed list of water system components and flow patterns are often used for this step.
- ◆ Identifying the type of control systems to implement. This step often requires assistance from third-party consultants. Providing the consultants with water system components, flow patterns, and suspect *Legionella* sources provides important information for the determination of control methods for specific water systems. In some instances, multiple control methods are implemented.
- ◆ Identifying where the control systems should be applied and the methods used to evaluate them. This often requires assistance from third-party consultants as well.
- ◆ Documenting monitoring method and frequency, which may be affected by system maintenance, renovations, equipment failure, and water service interruptions.

- ◆ Determining the response measure to be taken if *Legionella* concentrations exceed pre-determined allowances. Since building water systems are continuously changing, *Legionella* water concentrations will also fluctuate. Corrective measures should be planned to handle instances when the concentrations exceed the allowable limits.
- ◆ Developing systems to monitor the water management plan operation and effectiveness. Periodic inspections and third-party audits are often used to monitor plan operations.
- ◆ Documenting program maintenance, including inspection activities and corrective measures. Documentation should be maintained at the field location and/or corporate office.
- ◆ Communicating program status and incidents to affected personnel/occupants. E-mails, notices, bulletin boards, and periodic training are effective communication methods.

Evaluating the Operation and Effectiveness of a Water Management Plan



Once the *Legionella* Water Management Plan is developed and implemented, verification and validation of the plan is required. The initial installation of control measures, proper implementation of plan requirements, and ongoing maintenance of system components should be verified through document and system inspections. Verification should be conducted by personnel not directly affiliated with the process/program being inspected. Validation of the plan is conducted – via water testing or other methods – to confirm that the implemented control measures are effective at managing the *Legionella* water concentrations. If water testing for *Legionella* is selected by the facility, then the testing protocol and allowable parameters should be pre-determined.

Summary

So how do facilities reduce the risks associated with *Legionella* contamination of building water systems and the resulting bacterium amplification, distribution, and exposure? The first step is to develop written, facility-specific plans for managing building water systems – focused on the control of *Legionella*. The development of these programs will require an assessment of the facility operations, review of existing facility water supply systems, and determination of appropriate control measures. After development and implementation of the plan, facilities should evaluate the program to determine if they are effectively controlling *Legionella* water concentrations. Finally, facilities should document the maintenance of the program, water system alterations, and communications with building occupants.

HETI...Helping Control *Legionella*

HETI can assist facilities facing the challenges discussed above – in both the areas of prevention and response. We can provide building assessments, assistance in the development of *Legionella* Water Management Plans, and inspections to verify and validate the effectiveness of the plan at a facility.

To find out more about this and other HETI industrial hygiene services, please contact us.

Michael Henderson, PhD, CIH
Senior Industrial Hygienist, EHS Practice

Phone: 978.263.4044
development@hetiservices.com



1.800.347.HETI
www.hetiservices.com

This article is an interpretation of scientific, technological or regulatory information and is offered as a service to our clients and business associates. This material is not intended to be used or construed as HETI's professional advice, recommendations or legal opinions.