

State Approaches to Building Water System Regulation



Background

The most commonly reported cause of waterborne outbreaks in drinking water is by the bacterium *Legionella* (Benedict et al., 2017; CDC, 2019), which causes Legionellosis, a respiratory disease. The *Legionella* bacteria infect the lungs and can cause a severe pneumonia called Legionnaires' disease. The bacteria can also cause a less serious infection that causes mild flu-like symptoms called Pontiac fever. *Legionella* is found naturally in aquatic and moist environments like lakes, rivers, ground water and soil, and can be detected at low levels in treated drinking water, but it's important to note that the presence of *Legionella* is not always associated with a case of Legionnaires' disease. The biggest threat of Legionnaires' disease comes from the water in building water systems when the organisms proliferate and become aerosolized.

This leaves state primacy agencies in an uncertain position of trying to protect public health in an environment where it has very little to no legal authority or regulatory requirement to do so: there is no primary drinking water standard for *Legionella*. Furthermore, the Safe Drinking Water Act (SDWA) was not expressly intended to apply to building water systems.

How can states protect public health where there are no specific requirements they can enforce within regulations? The mission of this project was to provide states with some guidance.

Project Overview

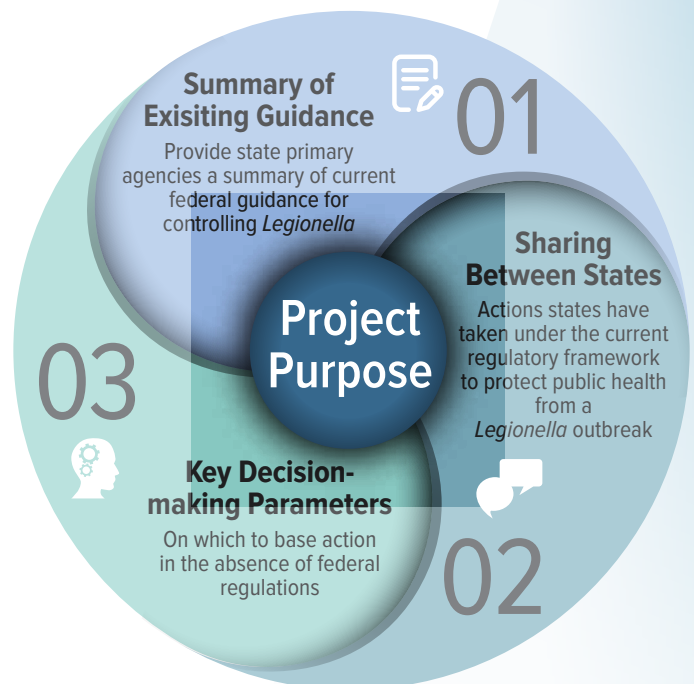
This document is the culmination of a study ASDWA conducted in 2019 to review state law, federal rules, and practice that address building water systems that are a customer of a public water system (i.e., do not have their own source of supply) but that install treatment to control *Legionella*. The purpose of this project, and this document, is threefold: (1) to provide state primacy agencies a summary of current federal guidance for controlling *Legionella*; (2) to identify the key decision-making parameters on which to base actions in the absence of a federal regulation; and (3) share what some states have been doing within the current regulatory environment to protect public health from a *Legionella* outbreak. States consulted for this guidance include Washington, Nevada, Pennsylvania, New York, Ohio, Rhode Island, Minnesota, New Hampshire and Connecticut.

Key questions asked and answered by the project include:

- What constitutes treatment?
- If treatment is installed does the building become a consecutive Public Water System (PWS)?
- If the facility becomes a new consecutive PWS, is it subject to all the regulation under SDWA?
- How could a state tailor its rule requirements if a building is determined to be a consecutive system?
- How should state agencies respond to detections of *Legionella* in building water systems?

Because every state has a unique set of circumstances, including state-specific statutory and/or regulatory requirements or limitations, no single approach to *Legionella* control can be applied to all. To that end, this document shares a sample of case studies from states in varying environments, with the intention of showcasing a menu of options for states who are looking for guidance they can consider for implementation.

ASDWA would like to thank the Steering Committee of volunteers who gave generously of their time to share their knowledge and experience to develop this document.



Review of Federal Rules and Agency Guidance on *Legionella* Control

There is no primary drinking water standard for *Legionella*. It is currently regulated under the Surface Water Treatment Rule (SWTR) with a maximum contaminant level goal (MCLG) of zero *Legionella* organisms for drinking water (USEPA, 1989). The rule specifies a treatment technique for *Legionella* control (e.g., filtration and maintenance of a detectable disinfectant residual). Monitoring for *Legionella* is not required. In the absence of a primary drinking water standard, some agencies have instituted rules and guidance for *Legionella* control and they are summarized here.





AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS (ASHRAE)

Because large building water systems vary in their design and their ability for transmitting *Legionella* there is no single approach for water management. That is why the ASHRAE Standard 188-2015 (updated in 2018) building water safety plan was developed. The standard consists of seven elements, including the creation of a water management team to oversee the building's water system. After the team is assembled, the building is surveyed to determine whether it has one or more of the following elements:

- Open- and closed-circuit cooling towers or evaporative condensers that provide cooling and/or refrigeration
- Whirlpools or spas, either in the building or on the site; or ornamental fountains, misters, atomizers, air washes, humidifiers, or other non-potable water systems or devices that release water aerosols in the building or on the site.
- Multiple housing units with one or more centralized potable water-heater systems.
- The building is more than 10 stories high (including any levels that are below grade).

Even if buildings do not contain any of the above elements, it is still best practice to create and implement a water management plan. ASHRAE also developed Guideline 12-2000, *Managing the Risk of Legionellosis Associated with Building Water Systems* to help building operators with information and guidance for control of Legionellosis associated with building water systems. The guidance is useful to operators of hotels, office buildings, hospitals and other healthcare facilities,

Federal Rules and Agency Guidance on *Legionella* Control

EPA 1	ASHRAE 2	CMS 3	CDC 4
MCLG & WSGs <ul style="list-style-type: none"> • No primary drinking water standard for <i>Legionella</i> • MCLG & treatment technique • Water Supply Guidance on treatment definition 	Standard 188 & Guideline 12-2000 <p>Elements of a building water safety plan for hotels, commercial buildings, healthcare facilities, schools & other facilities</p> 	S&C 17-30 Medicare/Medicaid Requirement <p>Development of water management plans for hospitals, nursing facilities and critical access hospitals</p> 	Legionella Toolkit <ul style="list-style-type: none"> • Based on ASHRAE 188 • Provides guidance and resources for building water management plans 

assisted living facilities, schools, universities, commercial buildings, industrial buildings, and centralized systems in multifamily residential buildings.

CENTERS FOR DISEASE CONTROL (CDC)

The CDC created a toolkit based on ASHRAE 188 for large healthcare buildings to ensure the safety of staff and the public. The toolkit includes practical resources to help ensure a comprehensive and effective system that holds to industry standards. Water management plans should be continuously maintained and updated. A new plan should be developed at least once a year or following any changes in these scenarios:

- any changes to the risk assessment
- when the building use has changed
- new information exists about risks or control measures
- checks indicate that control measures are no longer effective
- if a case of Legionnaires' disease is associated with the system

Similar to the program team for commercial buildings, hospitals and healthcare facilities need to create a water management team that also includes:

- Someone who understands the accreditation standards and licensing requirements for healthcare facilities
- Someone with expertise in infection prevention
- A clinician with expertise in infectious diseases
- Quality management staff

It may be necessary to hire outside professionals with *Legionella* experience to have people with all these backgrounds. Recently, professional organizations like the American Society for Sanitary Engineers (now ASSE International) have developed certifications for training and skills necessary to lead water management teams.

CENTERS FOR MEDICARE AND MEDICAID SERVICES (CMS)

In June 2017, the CMS issued Survey and Certification Letter (S&C) 17-30 Medicare/Medicaid *Legionella* Requirement for all Medicare-certified healthcare facilities to have water management policies and procedures in place to reduce the risk of growth/spread of *Legionella* and other opportunistic pathogens in building water systems (CMS 2017). The memo requires hospitals, nursing facilities and critical access hospital facility directors to have water management policies and procedures to reduce the risk of growth and spread of *Legionella* and other opportunistic pathogens in building water systems. The memo specifically cited the 2015 standard for *Legionella* control by ASHRAE (ASHRAE, 2015) and the 2016 Centers for Disease Control (CDC) toolkit for implementing the ASHRAE Standard (CDC toolbox, 2019). Facilities failing to comply with the requirements are at risk of citation for non-compliance with the CMS Conditions of Participation and subsequent loss of funding.

The Department of Veterans Affairs, Veterans Health Administration has also issued guidance in a directive issued in August of 2014. The directive specifies temperature control and maintenance of appropriate biocide within water systems of VA health care facilities.

Defining Building Water Systems (or Defining Decision-Making Parameters)

IS A BUILDING WATER SYSTEM A CONNECTION OR A PUBLIC WATER SYSTEM?



A key question states need to answer when considering what to do is determine whether a building water system is a public water system, or simply a service connection of a PWS, because this determines whether the building is subject to the state and federal laws governing public water systems.

The answer is, it depends. A building water system is simply a service connection if it purchases all of its water from a public water system and does not provide treatment to meet applicable national primary drinking water regulations. However, if the building water system provides water for human consumption to 15 service connections or regularly serves at least 25 people daily at least 60 days out of the year and is providing treatment (centrally or at the point of entry) for *Legionella* control, then it is considered a consecutive public water system.

Given that under these definitions, many building water systems (a small strip mall, an office building or an apartment complex, for example) that install treatment could be considered public water systems and subject to all the monitoring requirements of the SDWA, states may rightfully be concerned with the regulatory burden this situation poses.

[Water Supply Guidance \(WSG\) H26](#) points to 40 CFR §141.29 as providing “flexibility” to states to modify the monitoring requirements to the extent that the interconnection between the building water system and the water utility justifies considering them as a single system. The language of 40 CFR §141.29 is as follows:

“When a public water system supplies water to one or more other public water systems, the State may modify the monitoring requirements imposed by this part to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a schedule specified by the State and concurred in by the Administrator of the U.S. Environmental Protection Agency.”

WSG H27 suggests that the justification for treating the building water system (with a point of entry treatment unit) and the water utility provider as a single system for purposes of monitoring is to use the state’s considerable discretion “to avoid unnecessary compliance activities.”

[Water Supply Guidance H28](#) also provides similar direction for system compliance with the Surface Water Treatment Rule and the Total Coliform Rule. It states, “for compliance with the two rules, it will often be appropriate for the primacy agent to consider the supplier and the consecutive systems as a single unit.” “Because of the range of factors involved, the decision of how to treat the secondary system must be made on a case-by-case basis and that the primacy agent is in the best position to make that decision.” WSG H30 does note that 40 CFR §141.29 requires that primacy agents obtain EPA concurrence on decisions to reduce monitoring for consecutive systems.

WHAT IS TREATMENT?



A second key question for states to decide, after determining whether a building water system is a public water system or a service connection, is to determine what constitutes treatment. The standard dictionary definition of “to treat” is “to subject to some agent or action to bring about a particular result” is too broad to answer the question.

EPA does not define “treatment” in regulation. However, EPA has issued guidance documents with [Water Supply Guidance 8A](#) and [Water Supply Guidance H26](#).

The interpretation of “treatment” varies across states but it is generally agreed that the addition of a technology necessary to meet a primary MCL or treatment technique constitutes treatment. Most states also focus on chemical addition rather than physical removal – particularly if the result of the addition has the potential to cause an adverse impact on public health or an MCL exceedance.

Therefore, a more practical definition of treatment – at least in regard to building water systems that purchase all of their water from a PWS – is a technology that results in an adverse change in some regulated water parameter. Using this definition, states would need to manage the following parameters (as a bare minimum) for their respective treatment technologies:

Minimum regulated water quality parameters based on treatment technologies	
Building Treatment Technology	Regulated Parameter
Chlorine Dioxide	Chlorite, disinfectant residual
Chlorine (free or monochloramine)	THMs, HAAs, disinfectant residual
Ozone	Bromate
Copper/silver ionization	Copper, silver

Since some of the treatment chemicals could impact the corrosivity of the water, states could include lead and copper compliance testing. Softening potentially could impact lead and copper levels but would have minimal impact if the building was constructed after 1986 when lead materials and solder were banned. Additionally, if the materials downstream of the softener were constructed of lead (and copper) free piping, the water quality concerns with softening would be minimal.

ASDWA surveyed 30 primacy agencies in 2015 and again in 2018 and learned that there is great diversity of opinion among states on exactly what constitutes “treatment” that would require their oversight of building water treatment systems as public water systems. Although all states want to see these systems properly designed, constructed, and operated, only those treatment systems that result in chemical addition, and specifically, those with potential to increase prolonged exposure to disinfectants and by-products seemed to trigger regulatory oversight (interestingly, most excluded shock chlorination, perhaps presuming that this would be done infrequently, for a short period of time, or when the public would not be exposed). Among the survey responses there was a strong sense that applying public water system requirements to building water systems could be a deterrent to implementing effective control strategies for risk reduction – particularly for *Legionella* management, and that the regulatory burden could be unmanageable for both the state water program and the building owner. However, other states were equally concerned that the lack of oversight could lead to other unintended consequences.

State Approaches to Building Water Management Plans, Monitoring and Responding to *Legionella* Detections

Due to the lack of federal standards for *Legionella*, and the difficulty some states may have in taking action in the absence of a specific regulation, there is great disparity in how states are monitoring for and responding to *Legionella* detections. This disparity is not benign, as it can generate consumer concern and confusion. Development and implementation of a building water management plan provides a solid foundation that enables operators or facility managers to effectively control *Legionella* growth without chemical treatment. But, how can building operators be assured of their plan's efficacy? The international community has some answers.

The American Industrial Hygiene Association (AIHA) provides guidelines (AIHA, 2015) for routine *Legionella* monitoring in the absence of any reported illnesses. For all water system types (except cooling towers), a measured concentration below 1 CFU/mL is considered to be at the detection limit. Concentrations between 1-10 CFU/mL for potable water could be acceptable if elements of the water management plan are operating properly and there are no other deficiencies. For devices that generate aerosols (humidifiers, fountains, and hot tubs), concentrations between 1-10 CFU/mL would trigger actions to clean and disinfect the system. Higher concentrations of *Legionella* would indicate uncontrolled amplification of *Legionella* within the system and would trigger immediate steps to clean and disinfect the system and review and revise the water management plan. These values mirror those originally proposed by the Occupational Safety and Health Administration (OSHA, 2019) which had suggested guidelines for *Legionella* to assess the effectiveness for water system maintenance.

AIHA Data Interpretation Guidelines							
Sample Source	Non Detectable	Acceptably Low*	Action	Possible Amplification	Action	Indicates Amplification	Action
Humidifiers & Misters	<1 CFU/mL	<1 CFU/mL	1	1–10 CFU/mL	2	>10 CFU/mL	3
Decorative Fountains and Water Features	<1 CFU/mL	<1 CFU/mL	1	1–10 CFU/mL	2	>10 CFU/mL	3
Hot Tubs, Whirlpools and Spas	<1 CFU/mL	<1 CFU/mL	1	1–10 CFU/mL	2	>10 CFU/mL	3
Portable Water	<1 CFU/mL	<10 CFU/mL	1	10–100 CFU/mL	2	>100 CFU/mL	3
Industrial Working Fluids	<1 CFU/mL	<10 CFU/mL	1	10–100 CFU/mL	2	>100 CFU/mL	3
Cooling Towers & Evaporative Condensers	<10 CFU/mL	<100 CFU/mL	1A	100–1,000 CFU/mL	2A	>1,000 CFU/mL	3A

Action Levels (see AIHA 2015 for complete details):

1. Continue to monitor as per the plan.
2. If no cases of legionellosis, reassess maintenance and treatment plans; make adjustments as necessary. If cases of legionellosis occur, take immediate steps to clean and disinfect the system. Notify appropriate health authorities.
3. Take immediate steps to clean and disinfect the system. Adjust control plan as needed.

The European Union (EU) published proposed guidelines for the prevention, control, and investigation of infections caused by *Legionella* species (EU, 2017) that emphasize proper building water management plans focusing on obtaining proper temperature, biocide, operations and maintenance programs. Monitoring to demonstrate the effectiveness of the plans should meet the values shown in the below table. These goals incorporate both numerical threshold values like in the AIHA guidelines and targets for frequency of exposure — like the NY State. The EU guidelines emphasize the goal to achieve no cultural *Legionella* but acknowledges that occasional detection (<20%) of low levels of *Legionella* (< 1 CFU/mL) may be acceptable provided that other water quality values (e.g., temperature, disinfectant, etc.) and operational parameters were within the water management plan guidelines. Intermediate levels (1-10 CFU/mL) and high levels (>10 CFU/mL) would trigger a series of actions including resampling,

Legionella CFU/mL	Action Required
Not Detected	Acceptable – continue monitoring
<0.1 to 1.0	Assure water quality values are within target
1.0 to 10	i) Resample if small percentage (10-20%) are positive; review control measures ii) If >20% positive, disinfection of system, risk assessment
>10	Resample, immediate review of control measures, disinfection of whole system

Both the EU guidelines and the AIHA guidelines have helped states and building operators put their *Legionella* detection numbers into context, so that they are able to determine the efficacy of efforts and know when to take further action. The next section describes other steps some states have taken.

NEW YORK

In New York State (NYS) they have focused on the healthcare sector. All general hospitals and residential healthcare facilities that are regulated under Article 28 of the NYS Public Health Law are required to perform an environmental assessment, prepare and implement a sampling and management plan to sample their potable water systems for *Legionella*, and institute control measures in the event of a *Legionella* exceedance.

This regulation is not under the SDWA but is instituted under Article 28 of the hospital code. The NYS regulations subpart 4-2 require hospitals and healthcare facilities to monitor at a minimum of 10 samples in the hot water portion of their potable water systems for culturable *Legionella* and institute control measures and notify authorities when 30% or more of the samples collected contain *Legionella* spp. Subpart 4-2 applies to buildings of general hospitals that provide in-patient services or buildings of residential healthcare facilities that provide a “health related service,” such as lodging, board and physical care.

These regulations impose civil and criminal penalties for facilities that fail to comply with monitoring and reporting requirements. The sampling and management plan and sampling results must be maintained on the facility premises for at least three years and made available upon request.

FLORIDA

Florida is considering amending their rules to not discourage or provide a disincentive or barrier for supplemental building disinfection treatment to control *Legionella* risk. They were considering the following amendments:

1. Require prior state primacy agency approval but no state primacy agency construction permit
2. Eliminate any applicable PWS capacity development requirements
3. Require PWS compliance monitoring for only applicable disinfectants (including copper and silver in the case of copper-silver ionization) and DBPs
4. Require only the minimum level of staffing by a licensed water plant operator, and the minimum level of license for a water plant operator, regardless of the type of disinfection treatment or quantity of water treated
5. Limit the PWS annual operating fee
6. Eliminate any applicable PWS monthly operating report requirements

Florida states that to determine whether consecutive systems are subject to regulation as a PWS, they consider the phrase “treatment facilities” as excluding facilities that are not necessary to achieve, and

will not adversely affect, compliance with applicable drinking water standards and requirements. Thus, they typically would not regulate buildings that install softening, GAC, RO, or UV treatment units.

Additionally, they have not regulated buildings that install supplemental disinfection treatment for hot water only, but they believe they must regulate buildings that install supplemental chlorine/ chloramine, chlorine dioxide, or copper-silver ionization treatment for cold water.

NEVADA AND PENNSYLVANIA

Nevada and Pennsylvania are examples of states that have more closely regulated building water systems.

Pennsylvania has regulated building water systems that install chemical addition or treatment to meet a primary MCL as public water systems since the early 2000s. These facilities are regulated the same as any other public water system, with requirements that are commensurate with the type of water system and treatment provided. Treatment technologies used in building water systems must be permitted and approved. In addition, where treatment is installed in response to a *Legionella* outbreak, the state also requires the facility to develop and implement a water management plan. To date, permits to control *Legionella* have been issued for chloramines, free chlorine, and chlorine dioxide.

The states require buildings systems to be registered as public water systems (PWSIDs) and to gain state approval of the treatment technology. This is contrasted with states that, by law, can't enact any regulation not mandated by the EPA. This type of oversight role ensures the building water management plans are stronger and helps protect a building operator from hiring an unscrupulous vendor who might try to sell a treatment systems that are inappropriate for the application. For example, some systems in Nevada that have initially installed a booster disinfection system as part of their management program have observed elevated levels of disinfection by products and lead and copper. In a couple cases, systems have decided to remove the booster disinfection.

Management Options



The objective of this report was to provide state primacy agencies guidance for addressing *Legionella* control in building water systems. The objective was not to consider all variations that might be implemented. Therefore, a range of options could be considered, from treating building water systems as consecutive public water systems, to reliance on other authorities and building water management teams to collect and maintain monitoring data for inspection.

ASDWA will continue its convener role and collect, collate, and communicate options to help states address the control of *Legionella*, while recognizing the large disparity among states in their availability of resources and other issues of top priority.

The table below provides a list of options that states could use, particularly if they have limited flexibility due to legislation that restricts regulation to just federally mandated requirements, including those that exclude some components of building water systems (e.g., just hot water), to those that regulate building treatment systems as consecutive public water systems. There may not be a “one size that fits all,” solution but options exist to create greater uniformity across the states.

OPTIONS FOR MANAGING BUILDING WATER SYSTEMS			
States that lack the statutory or regulatory authority to go beyond federal MCLs	States that interpret coverage under the SDWA for cold water only	States that regulate building water systems with modifications	States that fully regulate building water treatment systems
<ul style="list-style-type: none"> • Leverage hospital codes – see NYS case study – or building plumbing codes • Provide guidance on CMS implementation • Provide training on water management plans 	<ul style="list-style-type: none"> • MCLs apply to cold water • Recommend 3rd party approved systems • Treatment on hot water only would be leveraged under hospital or plumbing codes 	<ul style="list-style-type: none"> • Use flexibility of 40 CFR §141.29 for compliance with monitoring requirements • Specify 3rd party approved systems, water management plans and certified operators • Compliance focused on DBP and possibly lead and copper. 	<ul style="list-style-type: none"> • Apply all current regulations commensurate with type of PWS and treatment • Incorporate water management plans in permit/approval

Conclusion

Legionellosis is the most commonly reported cause of drinking waterborne outbreaks, with most outbreaks associated with deficiencies within building water systems. The SDWA, NPDWRs, and related water guidance memos make it clear that when treatment is applied within a building water system, that system is considered a consecutive public water system. This can be of concern to states, however, 40 CFR §141.29 provides considerable discretion “to avoid unnecessary compliance activities.”

There is, therefore, considerable diversity in the way states regulate and manage building water treatment systems. This stems from varying opinions on what constitutes “treatment” that would require state oversight of building water treatment systems as public water systems. The EPA guidance of “treatment” is overly broad and there are exceptions even within existing rules. A more practical definition of treatment would be a “technology necessary to meet a primary MCL or treatment technique”.

Building water systems require oversight when chemicals are added that could have the potential to cause a risk to public health or an MCL exceedance. States can leverage hospital or building plumbing codes and established procedures for water management plans to implement monitoring and control processes for building water systems.

Several different guidelines are available from the international community for responding to *Legionella* monitoring results in water systems. Protocols can be combined to identify and correct any defects in the water management plans. In addition, there are opportunities to collaborate with other agencies (e.g., hospital licensing, health departments, building code and inspectors, etc.).

The bottom line is, despite the lack of clarity and definitive guidance on *Legionella* control available to states from the federal government, there are some alternative approaches for states to consider that enable them to better protect public health.

Disclaimer: Nothing in this document is intended to supersede or supplant any state requirements or programs that are more stringent.