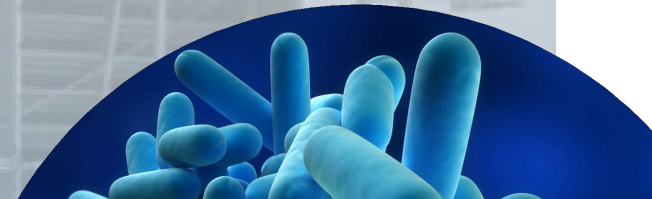


# Global Water Technology Presents:

## COVID-19 and the Ongoing Recommendations in Regards to Building Water



# About Your Speaker, Brian Burgess



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- Certified Water Technologist (CWT)
- ASSE 12080: Professional Qualifications Standard for Legionella Water Safety and Management
- Associate Professor at Triton College
- Industry Experience 10+ Years
- Instructor & Speaker:
  - BOMA Chicago (Since 2016)
  - IUOE, Chicago Local 399

# Today's Topics

Terminology of Water Systems

Efficiency and Safety

Process Systems

Domestic Systems

**What's Changed in 2021 with COVID-19**

# Systems Today – Terminology HVAC (Process)

## HVAC Systems:

### Cooling Towers

### Closed Loops

### Steam Boilers

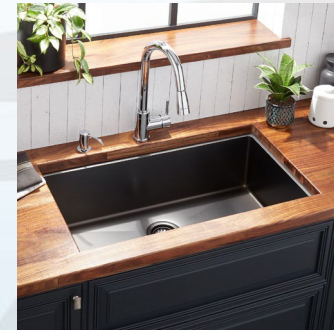


# Systems Today – Terminology- Domestic and Water Features

## **Domestic:**

### **Cold Water**

Once-Through



### **Hot Water**

Recirculating and Instantaneous

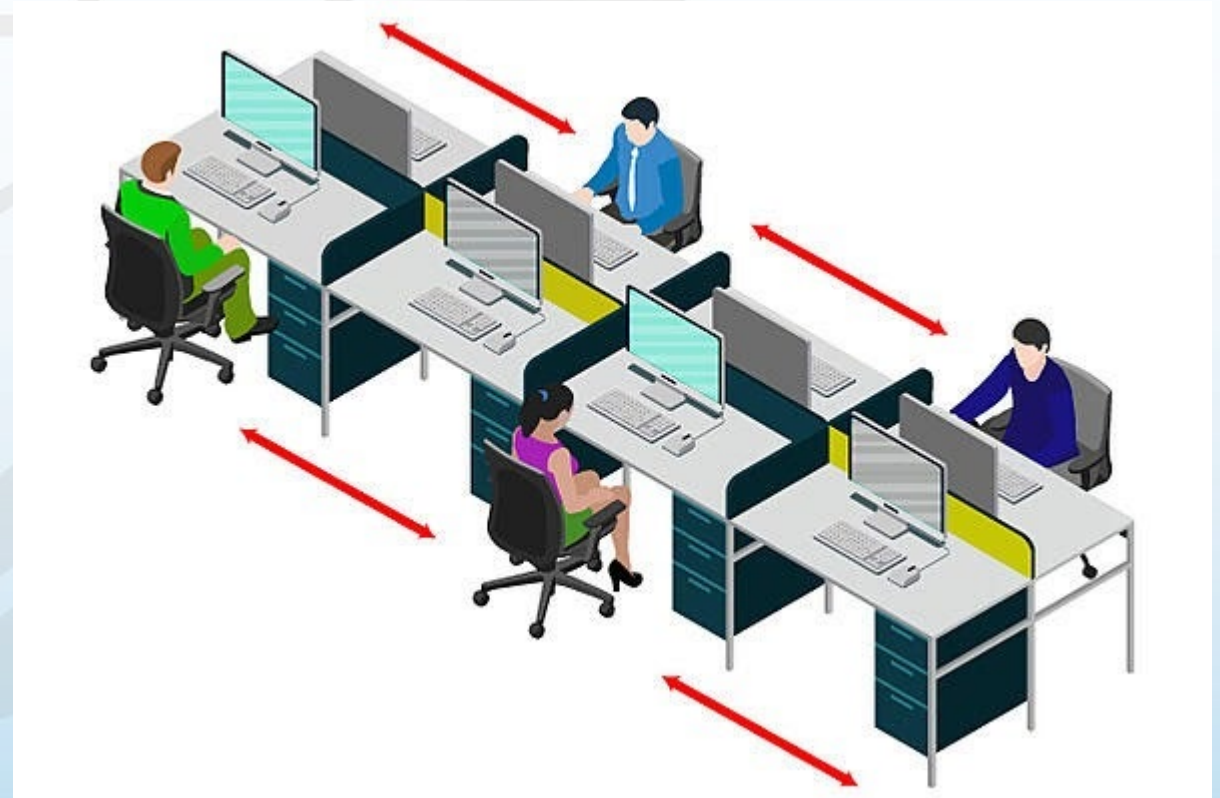
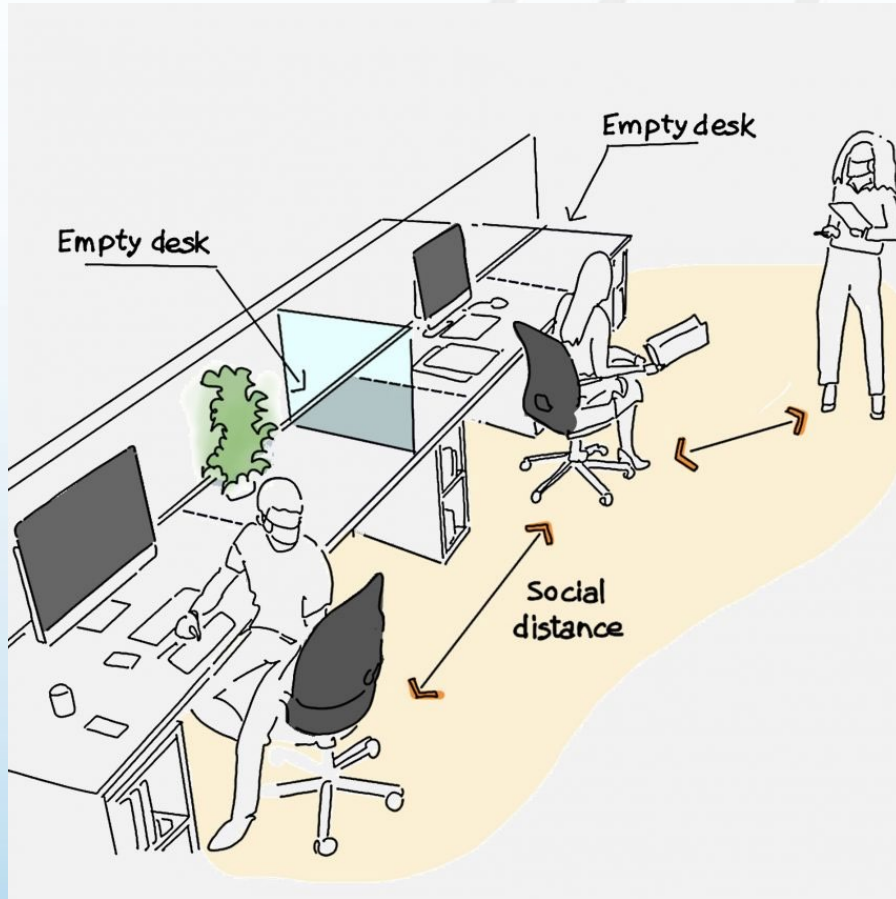
## **Other Water Features**



# Covid 19 Created Empty Offices



# We're Back to Normal, Sort of



# Building A Checklist: Still Unchanged Since Last Year

## Conduct an inventory of your facility's equipment and systems.

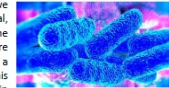
- HVAC/Process Water
- Domestic/Potable Water Considerations
- Additional Considerations



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### Tech Bulletin #8: Recommendations for Building Water System Safety During Periods of Low Usage

As the COVID-19 pandemic spreads across the country, how we look at and operate retail, entertainment, commercial, institutional, and hospitality facilities is rapidly changing. As the need for social distancing increases and shelter in place orders are put into place, our facilities are immediately affected by a decreased demand for HVAC and potable water system use. This creates a near immediate concern for both accelerated corrosion in HVAC systems and *legionella*, the waterborne bacteria responsible for Legionnaire's Disease. Expounded by the prospect that reduced occupancy and demand of our systems will likely persist even after lifting of more strict guidelines, action must be taken to protect the water side of your critical systems and prevent conditions for the growth of harmful bacteria, such as legionella.



Given that commercial grade systems were engineered with the intent of moving thousands of gallons per day and could now be reduced to a fraction of normal capacity or even total shut down, every facility affected should have a modified water safety plan.

**How could these conditions negatively affect my systems?** Stagnation reduces incoming disinfectant levels that municipalities add before entering your facility. It also increases or reduces temperature to ambient levels, providing the ideal conditions for biofilm growth and microbiologically induced corrosion.

**What systems are typically affected?** Primary distribution systems and associated piping, hot and cold-water storage tanks, hot water heaters, showerheads, faucets, ice machines, swimming pools, hot tubs, decorative fountains, cooling towers, and more...

**What are the long-term consequences?** Once a biofilm forms, it can be difficult to remove from a water system by the standard disinfectant source alone, and remediation can be costly and invasive. Persistent biological growth can lead to health and safety concerns surrounding legionella and biological fouling and corrosion of capital assets.

**How can you prepare for operating safely during this slowdown?** Managers and Engineers should take these proactive steps to ensure continued water safety and quality throughout their facility.

1. Conduct an inventory of your facility's equipment and systems.
  - How many potable hot water recirculating zones are there?
  - Does my facility utilize steam, hot/chilled water, and/or cooling towers which are seeing decreased use?
  - Is my facility fully shut down and fall into layup recommendations, or are we merely at reduced use?
  - What equipment was recommended to be shut down due to decreased use, and will that affect the long-term life?
  - What external factors, such as decreased flow through the water main, may affect my building as well?

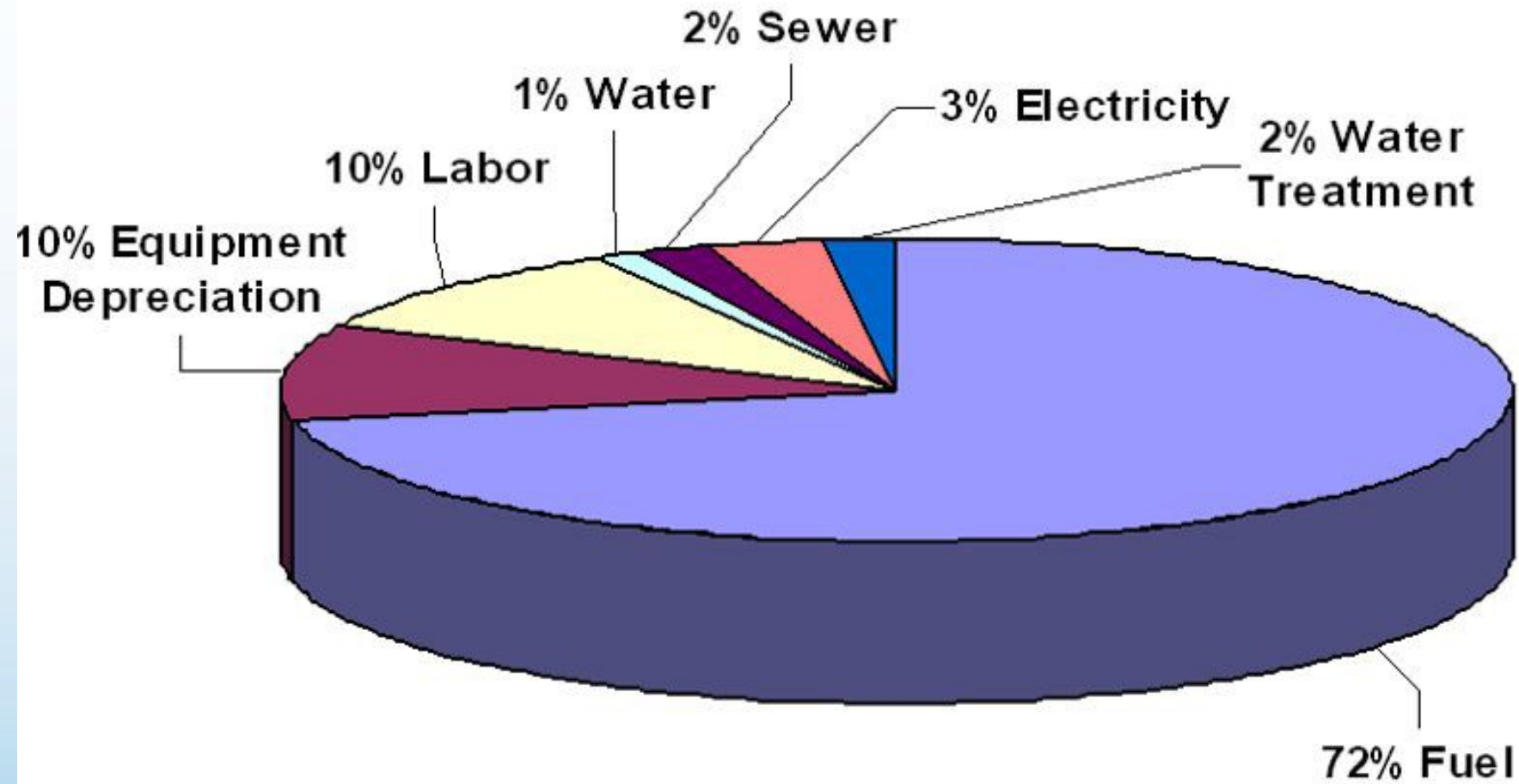
# Today's Topics

## Process Systems

# Water Treatment Prevents Corrosion



# Water Treatment Prevents Efficiency Losses



# HVAC Considerations: Steam Boilers

- Identify if this is part of “Critical Equipment”
- What does the steam boiler power?
- ASHRAE recommends any steam boiler over 7 days without use be put into “layup procedures”



# HVAC Considerations: Cooling Towers

- Comfort cooling may be scaled back, but this does not mean oversight should or else corrosion can happen
- Contractors for oversight may have issues with service
- Cooling Towers can breed legionella, the disease responsible for Legionnaire's Disease.
- Considerations to prevent “stagnation” or low disinfectant
  - Communicate with water treater when pumps are on
  - Pump Rotation Schedule
  - Drain and valve-off non-critical equipment
  - **Do not discontinue water treatment if equipment is on low use**



# Cooling Tower Advanced Tools

- Labor Shortages & Budget Cutbacks
  - On-line 365 biocide monitoring through advanced probes
  - Algae monitoring options
  - Corrosion Monitoring
- New Checklists for Engineers- Visual Inspection Increase



# HVAC Considerations: Closed Loops

- Pump staging and dead legs can create bacterial concerns
- Filters still require changing
- Make sure to kick on pumps to circulate chemical
- Install water meters to detect leaks



# Today's Topics

## Domestic/Potable Systems

# Switching Over: Domestic Systems

## **Critical Difference:**

In commercial real estate, hot and cold water often separated into two systems.

The cold water system enters and exits on a direct path

The hot water system typically recirculates

Both water systems can be at risk for amplifying legionella or having high metals (lead) contaminates.

# Recent News

News

## Bacteria in N.J. p

Updated Apr 04, 2021:

By [Blake Nelson](#) |

New Jersey of the water at o staff memo o

Legionella wa Prison in New since moved i causes Legior dangerous for according to t

BY GREG SWAFFORD | JUL 02, 2021

## PART I: EMERGING TRENDS A PLUMBING

Part I of this two-part series explores emerging trends affectin



The number of Legionnaires' disease cases reported to the U.S. C been on the rise for two decades. As the number of cases continue

## Legionella Bacteria Located in Water Supply Where Inmate Died at Northern State Prison

## Reopening hotels comes with risk if water systems are not being checked

By Gerardo Fortuna | EURACTIV.com

Jun 25, 2021 (updated: Jun 28, 2021)



INVESTIGATIONS

## Source of deadly Legionnaires' Disease outbreak at North Portland apartment building remains a mystery

Despite efforts to fix the building's water system, residents at Rosemont Court are still getting sick and health officials don't know why.

## Supporter

This stakeholder supports EURACTIV's coverage of Water and health. This support enables EURACTIV to devote additional editorial resources to cover the topic more widely and deeply. EURACTIV's editorial content is independent from the views of its supporters.

IDEXX

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# Cold Water System Lead and Legionella Concerns

## Legionella:

- Not typically a concern for most systems as legionella does not start to amplify below 68 degrees (incoming water temp stays well below)

## Lead

- Greater concern if using galvanized piping prior to 1986
- Older fixtures also have greater concern
- Solution: Flushing Protocols

# Cold Water System Flushing Protocols- Updated for 2021

## Legionella/Lead:

- Temperature:
  1. Record temperature of nearest point of entry.
  2. Flush desired outlets until temperature is near equal to incoming water temperature for a desired period of time (2 minutes is standard)
  3. Troubleshoot any outlets which are not dropping temperature
- Disinfectant Residual (Free Chlorine)
  1. Record free chlorine residual at nearest point of entry
  2. Flush desired outlets until FCR is near equal to incoming water FRC for a desired period of time (2 minutes is standard)
  3. Troubleshoot any outlets which are not coming into FCR

# Hot Water System Lead and Legionella Concerns

## Legionella:

- Much greater concern as recirculating loop will have “dead legs” in unused rooms and outlets
- Unused rooms have ambient temperature around 70 degrees
- Identify how many zones and to what areas are fed
- Storage water heaters and hot-water storage tanks should be adjusted or maintained so they deliver water consistently at or above 140°F (ASHRAE 12-2020)
- If hot water heaters are turned off, document plan for turning back on

## Lead

- Lower concern as hot water piping is not typically to be used for drinking

# What We've Seen in 1 Year of Testing

- Legionella increases in hot water systems- 20-50%
- Offices, hotels, and commercial real estate affected the most
- Some increase in hospitals when certain wings were closed.
- Residential was unaffected

Legionella Summary Sheet

Client Sample #	Sample Location	Volume (mL)	MRL (CFU/mL)	Results (CFU/mL)	Legionella Isolated
1	1	200	0.5	N L I	
2	2	200	0.5	N L I	
3	3	200	0.5	N L I	
4	4	200	0.5	N L I	
5	5	200	0.5	N L I	
6	6	200	0.5	N L I	
7	7	250	0.4	8	Legionella pneumophila Serogroup
8	8	250	0.4	N L I	
9	9	250	0.4	N L I	
10	10	200	0.5	N L I	

Client Sample #	Sample Location	Volume (mL)	MRL (CFU/mL)	Results (CFU/mL)	Legionella Isolated
1	1	250	0.4	<1	Legionella pneumophila Serogroup 2-14
2	2	250	0.4	N L I	
3	3	250	0.4	N L I	
4	4	250	0.4 0.4	<1 2	Legionella pneumophila Serogroup 2-14 Legionella species (not pneumophila)
5	5	250	0.4 0.4	<1 <1	Legionella pneumophila Serogroup 2-14 Legionella species (not pneumophila)
6	6	250	0.4	1	Legionella pneumophila Serogroup 2-14
7	7	250	0.4	<1	Legionella pneumophila Serogroup 2-14
8	8	250	0.4 0.4	2 3	Legionella pneumophila Serogroup 2-14 Legionella species (not pneumophila)
9	9	250	0.4	<1	Legionella pneumophila Serogroup 2-14
10	10	250	0.4	2	Legionella pneumophila Serogroup 2-14

# Recommended Testing for Buildings without a Water Management Plan

Have a discussed plan of remediation before testing

## Bacterial Testing:

- Legionella
- E.Coli and Total Coliforms

## Test Amounts:

Dependent on Building Size



### CHECK LIST For Maintaining or Restoring Water Quality in Buildings with Low or No Use

As the COVID-19 pandemic spread across the country, how we operated retail, entertainment, commercial, institutional, and hospitality facilities rapidly changed. As the need for social distancing increased and shelter in place orders were put into place, our facilities immediately saw a decreased demand for HVAC and potable water system use. This created an immediate concern for both accelerated corrosion in HVAC systems and *legionella*, the waterborne bacteria responsible for Legionnaire's Disease. Ideally action was taken during the shutdown to mitigate these concerns. Now, as we eye reopening, action must be taken to continue, verify, and validate those efforts to ensure proper water safety and quality. We have prepared the following checklist and recommendations to ensure a smooth and safe return to normal operating conditions.

*If not already in place, this is the time to develop a Water Management Program (WMP) for your facility.*

#### SYSTEM INVENTORY ANALYSIS

- ☐ Review Flow Diagram to verify that it is up to date – identify both HOT and COLD water risers.
- ☐ Review Critical Control Points (CCP) and Control Measures to verify they are up to date.
- ☐ Conduct an inspection of the facility plumbing to ensure it is functioning properly.

#### HVAC/NON-POTABLE WATER CONSIDERATIONS

- ☐ Cooling tower water must not sit idle. Recirculate water and add biocide daily.
- ☐ Rotate cooling tower water recirculating pumps weekly to avoid stagnation and dead legs.
- ☐ Check inventory of any necessary chemistry & testing reagents (towers, boilers, loops, etc.). We currently recommend a 4-8 week supply with a 4 week inventory re-order point.
- ☐ Schedule cooling tower and chiller cleaning as soon as possible.
- ☐ Schedule cleaning of water features, spas/hot tubs, emergency eyewash and shower stations. Follow manufacturer disinfection procedures.
- ☐ Change all filters on closed loops.

### TECHNICAL BULLETIN #9



#### FOR ADDITIONAL INFORMATION

Please reach out to one of the following representatives or visit us online!

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# Example of A Recent Testing and Remediation Strategies

**Building A:** A boutique hotel in Chicagoland had a reopen set, and tested positive in a majority of outlets

*Solution:* A hyperchlorination using chemistry, NSF certified sodium hypochlorite.

**Building B:** A commercial real estate building had its first positive legionella test in over 4 years from less usage

*Solution:* The facility was able to adjust temperatures over the weekend and use primary flushing to remove the legionella to below detectable limits.



# Choosing Remediation

**Materials and Schedules**

**Safety concerns over chemistry and temperatures**

**Appropriate contact risk with employees and tenants**

**System size and labor availability**



# Largest Mistakes To Avoid

Turn off small hot water heaters or make sure they're set to appropriate temperatures for the system

Hot water zones should have a flushing plan for any unused floors or offices



# A Water Management Plan Is the Best Option for Legionella Protection

- About 9 in 10 (90%) are due to process failures, like not having a Legionella water management program
- About 1 in 2 (52%) are due to human error, such as a hot tub filter not being cleaned or replaced as recommended by the manufacturer.
- About 1 in 3 (35%) are due to equipment, such as a disinfection system, not working.
- About 1 in 3 (35%) are due to changes in water quality from reasons external to the building itself, like nearby construction.
- Source: *CDC Vital Signs*: June 2016

# Additional Reading and References

- Considerations for Large Building Water Quality after Extended Stagnation- V5, 60 Pages

## Considerations for Large Building Water Quality after Extended Stagnation

### AUTHORS

Caitlin Proctor, William Rhoads, Tim Keane, Maryam Salehi, Kerry Hamilton, Kelsey Pieper, David M. Cwiertny, Michele Prévost, Andrew Whelton

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April 07, 2020

LAST EDITED  
April 08, 2020

SUPPLEMENTAL MATERIALS  
[osf.io/wr4mp/](https://osf.io/wr4mp/)



- CDC: Guidance for Building Water Systems

### 8 Steps to take before your business or building reopens

1. Develop a comprehensive water management program (WMP) for your water system and all devices that use water. Guidance to help with this process is available from CDC and others.

#### a. Water Management Program Toolkit:

This toolkit is designed to help people understand which buildings and devices need a *Legionella* water management program to reduce the risk of Legionnaires' disease, what makes a good program, and how to develop it.

<https://www.cdc.gov/legionella/wmp/toolkit/index.html>

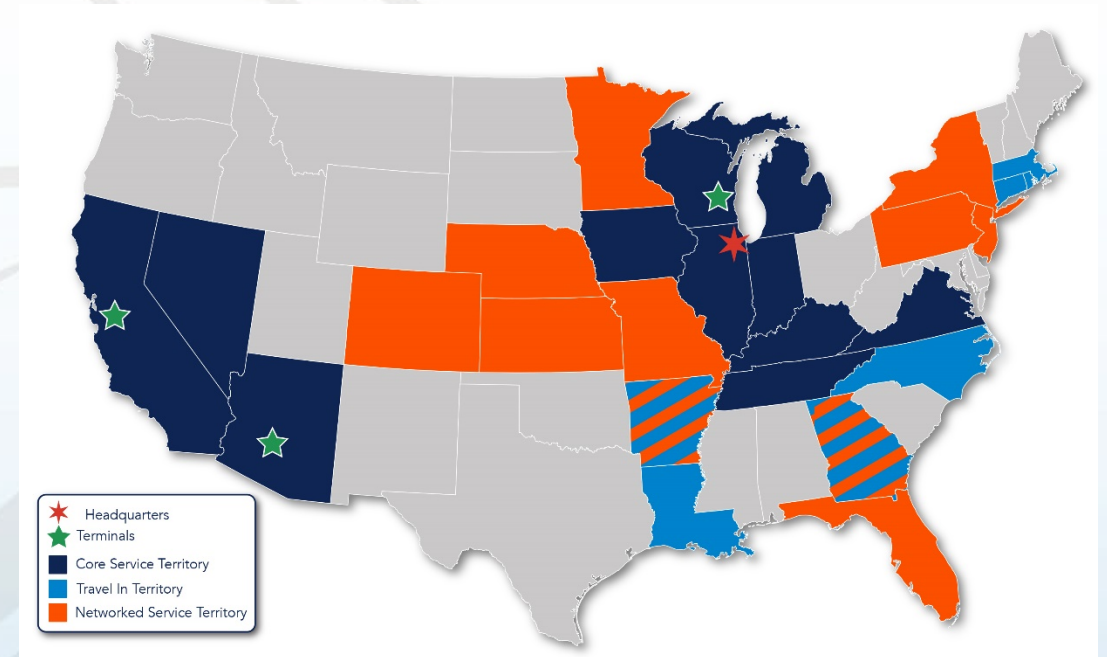
# About Global Water Technology, Inc. (GWT)

Global Water Technology, Inc was established in 1990, to support the Chicagoland area. Since inception, GWT has grown from a small local business to a regional powerhouse in a diverse field of water treatment issues. GWT is a partner with the Association of Water Technologies (AWT) and has a growing number of Certified Water Technologists on site to service Chicagoland, the Midwest, and the World.

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# “Line Card” & Questions

**Treatments and Equipment**

**Steam Boilers - Cooling Towers - Closed Loops  
Wastewater**

**Non-Invasive Pipe Evaluations**

**Grease Line and Trap/Ejector Pit Treatment  
Laboratory Services**

**Water Management Plans Compliant with ASHRAE 188**

**Legionella Management, Testing and Remediation**

**Lead Testing and Remediation**

**Consulting and Ongoing Service on All the Above**



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