

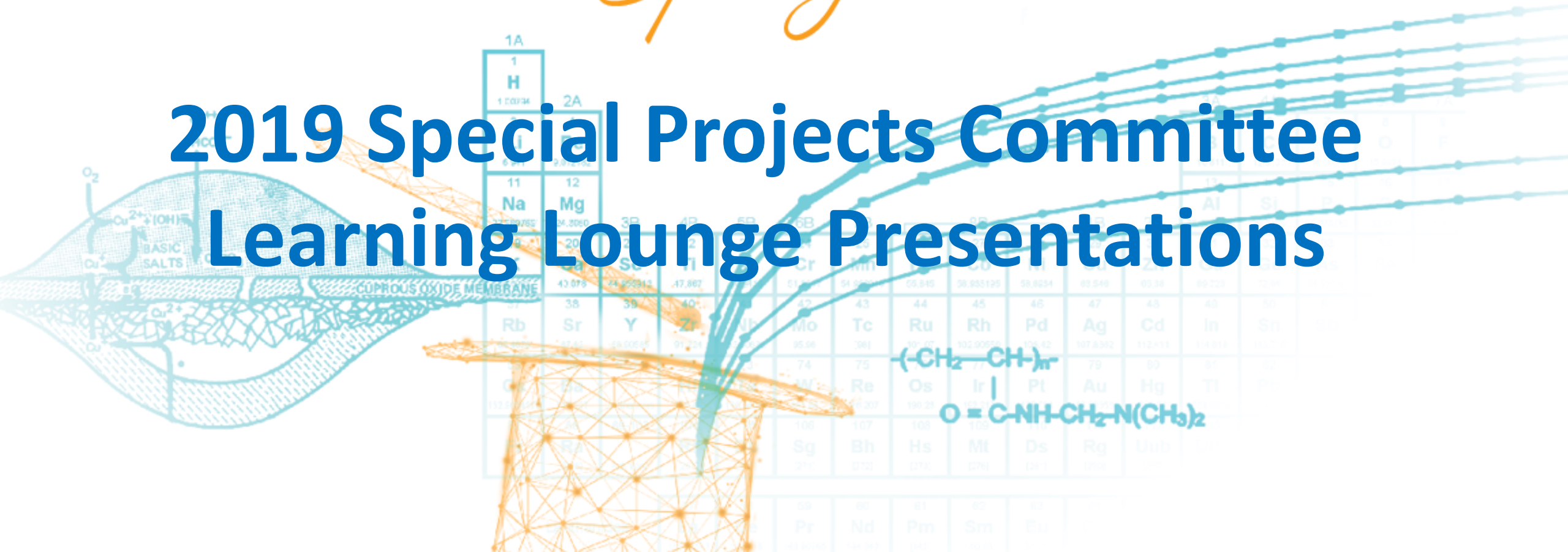


# Annual Convention & Exposition

September 11-14, 2019 Palm Springs Convention Center and Renaissance Palm Springs Hotel

*Palm Springs, CA*

## 2019 Special Projects Committee Learning Lounge Presentations





# Special Projects – Learning Lounge

## Part I

### The Do's and Don'ts of Dip Slide Testing

Presented By:

Landon Markes – Lovibond  
Tintometer

Teresa Williams - Masters Company

## Part II

### Legionella and POU Filtration

Presented By:

Brady Benson – AquaMedix

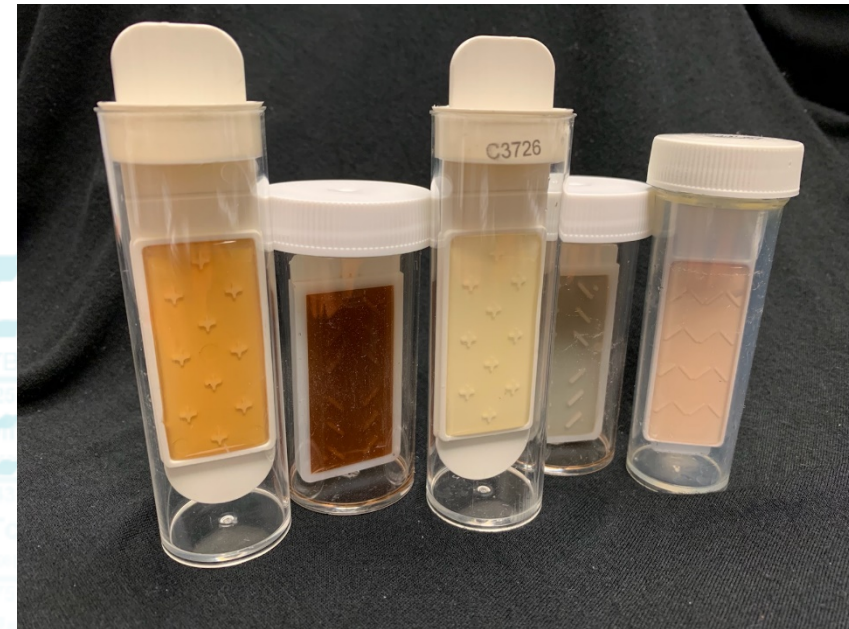
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# Do's and Don'ts of Dip Slide Topics

- What kind of dip slides do you have?
- Storage and care of dip slides.
- Common issues with dip slides.
- Sampling and incubating with dip slides.
- Common questions when reading results of dip slides.
- Disposal of inoculated dip slides.

# The Do's and Don'ts of Dip Slide Testing

- Understand there are many types of dip slides available in the marketplace.
- Choose the correct slide for your application.
- Be aware of the difference between aerobic and anerobic types of slides.





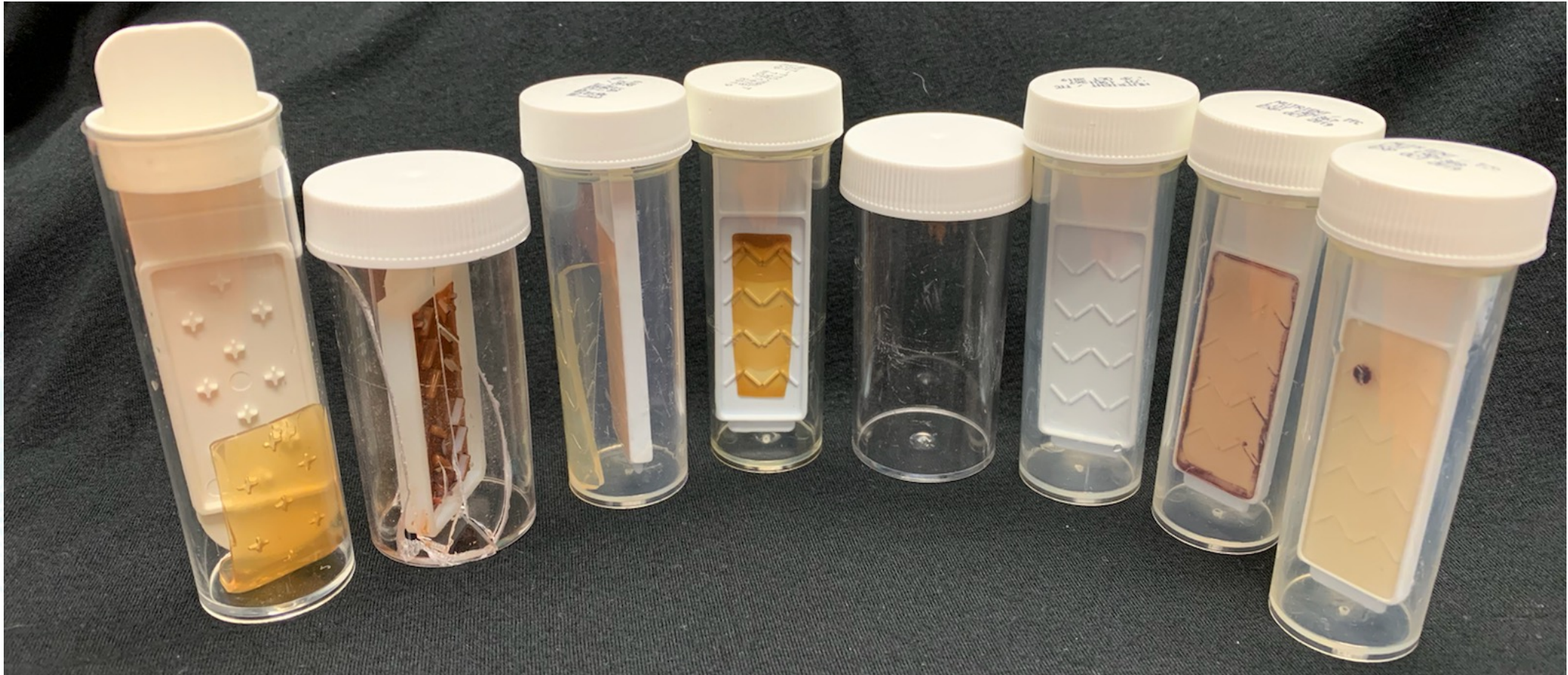
# Storage and Care of Dip Slides

- You've received the Dip Slides - do they look okay?
- There's some condensation/liquid inside the vial? How much is too much?
- I just received my Dip Slides and several already have growth on them? Can I still use them?
- Some of my slides are dried out, can they be used?
- Media is off the paddle – I can glue them back on and use them?

# Storage and Care of Dip Slides

- Expiration date on the box or dip slide vial - has passed but the slides look okay still, can I still use them?
- Should I store my dip slides in the refrigerator until use?  
Condensation/Liquid when I remove?1
- Driving from account to account-it's hot-okay to leave the slides in my car/trunk all day? What about AFTER Dip Slide is inoculated?  
Beer out of cooler-dip slides in!
- Cold outside can I leave them in my car or truck?  
Condensation/Liquid when I use.

# Common Dip Slide Issues





# Dip Slide Sampling & Incubating

- What is the best way to inoculate the dip slide with the sample water?
- Do I need to expose the entire agar media or just some of it?
- Shake off EXCESS water?
- Do I need an incubator?
- How long do I have to wait for results?



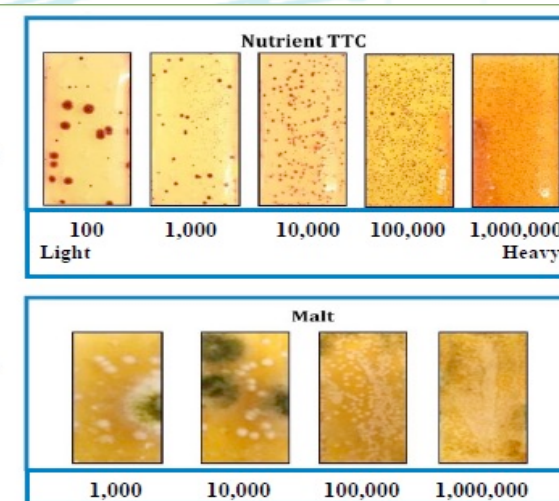
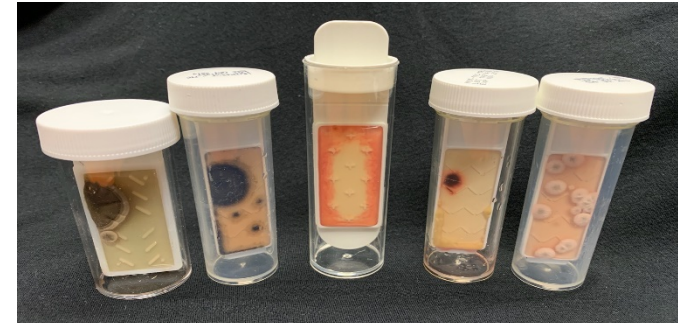
# Dip Slide Sampling & Incubating

- What is the incubation temperature +/- for the dip slides?
- Dip Slides kept in the dark during incubation?
- How long do I have to wait for results?
- Dip Slides incubated longer than I should have, is that a problem?



# How do I interpret the test results?

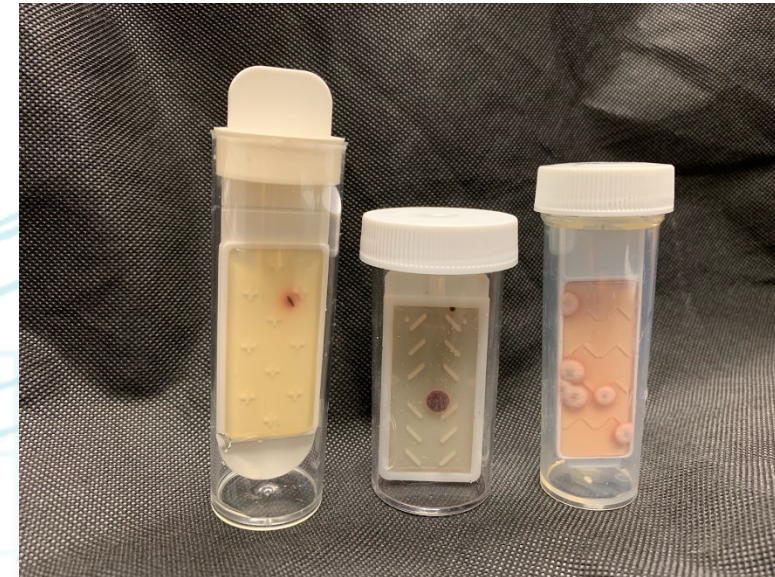
- There are larger dots on my dip slide what does this mean?
- Some of the colonies on the dip slide are not red, why?
- Dip Slide turned all pink/red almost immediately, what does that mean?
- What does  $10^4$  mean?





# How Do I Read the Results?

- Do dip slides specifically pick up Legionella?
- How do I know if CFU reading is an acceptable amount for the system I am testing?
- Are there CFU guidelines to follow?
- Would biocide content in the sample water affect the dip slide count?





# The testing is done!

- The testing is finished – best way to dispose of contaminated Dip Slide?!
- Incinerate?
- Dry Garbage?
- Scrape & Flush?
- Rinse/dissolve in Hot Water, down the sink?





## Questions – Comments?

Further questions or  
needs?

Feel free to contact any of  
the Testing/Reagent or  
Dip Slide Suppliers in the  
exhibit hall!

A Hearty Thank You!

Teresa Williams  
Landon Markes

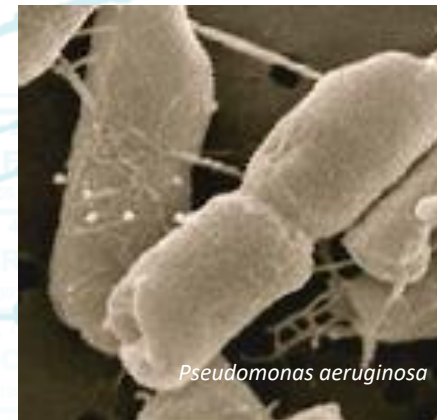
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# Part II

## Legionella and POU Filtration

Immediate Solution

Long-term Control





# Standard for WMPs

## ASHRAE 188



ANSI/ASHRAE Standard 188-2018  
 (Supersedes ANSI/ASHRAE Standard 188-2013)  
 Includes ANSI/ASHRAE addenda listed in Annex D

### Legionellosis: Risk Management for Building Water Systems

See Information Annex D for approval forms

This Standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda for revision, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. The change submission form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or in paper form from the Senior Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Taylor Drive, P.O. Box 5006, Atlanta, GA 30328-0006. E-mail: [standards@ashrae.org](mailto:standards@ashrae.org); Fax: 478-524-1174; Telephone: 404-876-8900 (worldwide), or toll free 1-800-527-4773 (for orders in US and Canada). For reprint permission, go to [www.ashrae.org](http://www.ashrae.org) or write.

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Standard 188-2018



Emergency Water Supply Plan



Emergency Operating Plan  
 Required by the Joint Commission  
 and CMS

Centers for Disease Control and Prevention and American Water Works Association. Emergency Water Supply Planning Guide for Hospitals and Healthcare Facilities. Atlanta: U.S. Department of Health and Human Services; 2012. Updated 2019.

# Water Management Plan in a Nutshell

1. Create a Team
2. Map the Water System
3. Identify Risks
4. Develop Strategies to Address
5. Monitor and Respond
6. Review Periodically
7. Document

# Hospital Acquired Infections (HAI)

## Bacteria that chlorine does not always kill

### Andy's bug list

- *Stenotrophomonas maltophilia*
- *Pseudomonas aeruginosa*
- *Burkholderia cepacia*
- *Serratia marcescens*
- *Acinetobacter calcoaceticus* var.
- *Chryseobacterium meningosepticum*
- *Aeromonas hydrophilla*
- Atypical Mycobacterium species
  - *M. chelonae*, *M. avium*, *M. mucogenicum*,
  - *M. gordoniae*, *M. fortuitum*, etc.
- *Legionella* species
  - *L. pneumophila*, *L. bozemanii*, etc.
- *Mycobacterium Abscessus*
- *Elizabethkingia*

### Stout Bug list:

- Legionella*
- Acinetobacter*
- Pseudomonas*
- Mycobacterium*
- Stenotrophomonas*
- Elizabethkingia*
- Klebsiella*

### NSF International in their HACCP for Building Water

- *Acinetobacter*
- *Elizabethkingia*
- *Klebsiella*
- *Pseudomonas*
- *Stenotrophomonas*
- Non-Tubercular Mycobacteria
- *Legionella*
- *Acanthamoeba*
- *Harmannella*
- *Aspergillus*
- *Fusarium*
- *Norovirus*
- *Hepatitis A*



# Water Management Plan Team



- Team should include multiple stakeholders – e.g. Facilities, Clinical, Infection Control, Construction, Water Treatment, Legionella Consultants, Risk Management
- Facilities and Infection Control are on the front line
- Preventing HAI's is Priority
- If your team is small, supplement it with outside consultants, remember it's Management and/or Owners responsibility

# Sources of Infection

- **Potable Water**

- Faucets – Drinking, eating, washing
- Shower Heads (or Handles) - Bathing
- Ice Machines – Drinking

- **Other water aerosolizing sources**

- Ornamental Fountains, Spas, Pressure Washes, humidifiers

**Goal – Break the Chain of Infections**



# NY State Guidelines

Interpretation of Legionella Culture Results	
< 30% of Sites Test Positive	Maintain assessment – with sampling and management plan
30% or Higher Test Positive	Institute <b>Short Term control measures</b> with a qualified professional Resample Water System after 7 days but before 4 weeks after disinfection
Persistent >30% Positive	Institute long-Term Control measures
Interpretation of Legionella Culture from Cooling Towers	
Legionella Test Results CFU/mL	Response
Levels above 20 CFU/mL but under 1000	Review Treatment Program, Online disinfection, retest in 7 days
For levels less than or equal to 1000 CFU/mL	Review Treatment Program, provide notification to proper parties, Immediate online decontamination, retest until levels are below 20 CFU per mL



# OSHA Suggested Action

Action	Cooling Tower	Domestic Water	Humidifier
1	100 CFU/ml	10 CFU/ml	1 CFU/ml
2	1,000 CFU/ml	100 CFU/ml	10 CFU/ml

- **OSHA technical manual...**
  - Action 1: Prompt cleaning and/or treatment of the system.
  - Action 2: Immediate cleaning and take prompt steps to prevent employee exposure.

# Emergency/Contingency Plan Action

- **Suggested Part of Water Management Plan**

Immediate Protection Measures such as POU

- One Person Presents – Contact State Dept of Health
- Two People Present – It's an outbreak – CDC is notified

## ASHRAE 188

5. Monitor and Respond

6. Review Periodically

- **Contamination of Municipal Water System**
- **Low levels or no levels of Municipal chlorine in Municipal Water**
- **High levels of bacteria in domestic water system**
- **Destruction and renovation**

# What Happens When...

- One Person Presents – Contact State Dept of Health
- Two People Present – It’s an outbreak – CDC is notified

Your Legionella Emergency Contingency Plan comes into play

- **Impose Water Restrictions\***
- **Short Term Control Measures**
  - Point-of-Use Filters – Only Immediate Solution
  - Flushing
  - Heat and Flush
  - Hyper Chlorination
- **Re-sample**

\*See Joint Commission EC.02.05.01



# Point of Use Filtration

- Provides immediate protection when Legionella is detected
- Allows Facilities to return to normal operations rapidly
- Can be combined with secondary disinfection providing a more effective measure of safety
- Recommended for use in High risk areas for HAI (Hospital Acquired Infection)

Immediate Solution

Long-term Control

# Risk Control Strategies & POU

- **Identify and Protect High Risk Areas**

Neonatal

Dialysis

ICU

Chemo Treatment

Oncology

Transplant Unit

**PICK WHERE FILTERS SHOULD BE INSTALLED NOW**

- **Identify Potential Source of Infection**

- Affected patient rooms
- Common showers

- **Deploy filters at the Shower, the Faucet, and the Ice Machine**

## Contingency (Emergency) Response for Water Management plans, Point of Use (POU) References

Infection Control and Hospital Epidemiology, February 2011, "Controlling *Legionella* in Hospital Drinking Water: An Evidence-Based Review of Disinfection Methods": Lin, Stout, Yu.  
<http://www.specialpathogenslab.com/research-publications-1.php>  
 Page: 170

VA Legionella Directive 1061 August 13, 2014  
 VA 1061 [http://www.va.gov/vhapublications/ViewPublication.asp?pub\\_ID=3033](http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=3033)  
 Page 15 - Item ee. Point-of-use filter.  
 Page A-5, c. Supplemental Actions, c. Point-of-use Filters are identified as a prevention method.

NY State, Health Advisory: Prevention and Control of Legionellosis (Legionnaires' disease) in Healthcare Facilities. August 10, 2015  
[https://www.health.ny.gov/diseases/communicable/legionellosis/docs/2015-08-10\\_health\\_advisory.pdf](https://www.health.ny.gov/diseases/communicable/legionellosis/docs/2015-08-10_health_advisory.pdf)  
 Page: 14, 17 & 20

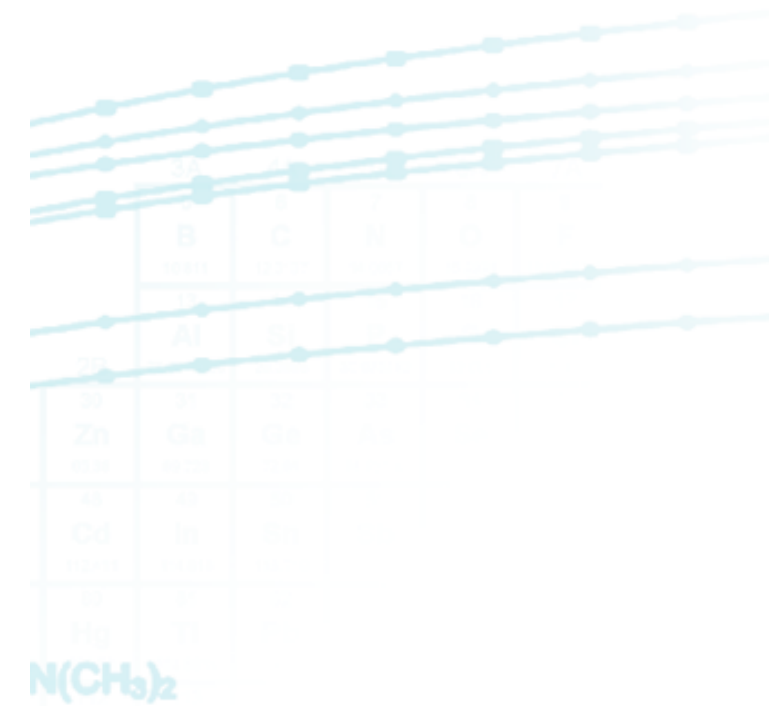
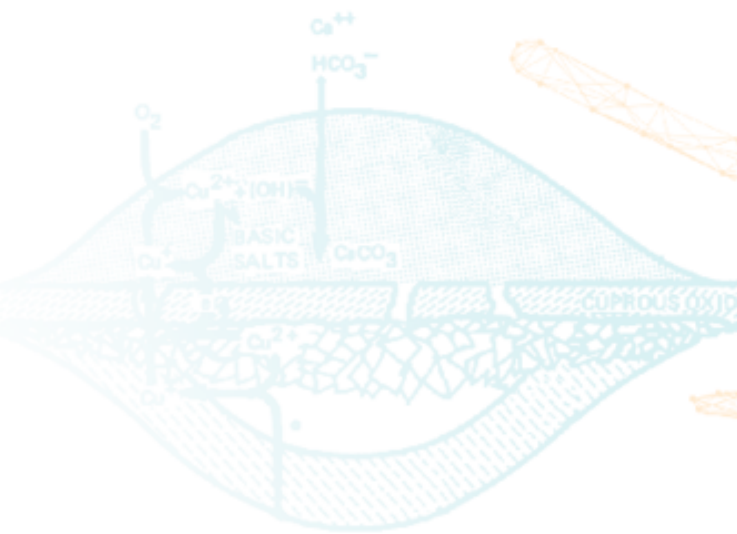
EPA legionella\_document\_master\_september\_2016\_final  
[https://www.epa.gov/sites/production/files/2016-09/documents/legionella\\_document\\_master\\_september\\_2016\\_final.pdf](https://www.epa.gov/sites/production/files/2016-09/documents/legionella_document_master_september_2016_final.pdf)  
 Page: 38, section 2.3.2.2  
 Page: 50, section 2.3.3.4  
 Page: 74-77, section 3.2  
 Page: 81, section 4, Q8

ANSI/ASHRAE Standard 188-2018  
 Legionellosis: Risk Management for Building Water Systems  
<https://www.ashrae.org/technical-resources/bookstore/ansi-ashrae-standard-188-2018-legionellosis-risk-management-for-building-water-systems>  
 Section 3. DEFINITIONS, control measures. Section A3.1 c  
 Contingency Response Plan: see sections 7.1.4, 7.2.8, 7.3.5.3, 7.4.5

Please contact AquaMedix for additional information regarding how POU filtration fits into a water management plan. 952-479-0636 | [www.aquamedix.net](http://www.aquamedix.net) | [info@aquamedix.net](mailto:info@aquamedix.net)

The information in this document has been reviewed for accuracy and believed to be accurate.

POU reference document Contingency (Emergency) Response 1.4 rev20181127





# POU



Shower Handles



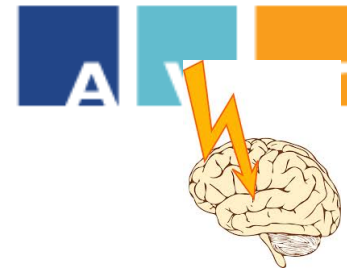
Faucets



In-Line Filter (Ice Machine)

# Point of Use Filters

- **0.20 Micron absolute –accepted standard**
  - Generally accepted by NY State, EPA, VA SYSTEM
  - Testing to ASTM Standards
- **30 day, 60 day, 90 day or 6 month life typical**
- **Applied at the Faucet, Shower Handle, Ice Machine**
- **Regulation ?? EPA, FDA, CDC, State....**



## Common Filter Headaches

Filter plugs as soon as installed, does not last until the expiration time.

Doesn't fit on the threads properly. Can't figure out how to install it.

Costs too much money and too much labor.

- Long-life filters
- Smaller facilities less than 60 beds
- Areas of High-Risk (HAI)
- Rural communities not using chlorinated water

Ice Machine Plumbing Connections





# Ice Machine Considerations

- Internal Temperature is perfect for Legionella
- Typical Filters use Carbon to improve taste
  - Also removes the disinfectant
- Many filters are in the 3.0 to 0.5 micron size – too big for Legionella and Pseudomonas
- CMS, Joint Commission, CDC
  - All mention Ice Machines as a source of Legionella infection

# Ice Machine Concern List

- ✓ Ice machine cleaned at site of use
- ✓ Carbon filtration is being used on the ice machine
- ✓ Ice machine is cleaned less than semi-annually

If any of these statements are true bacterial retention filtration should be used.

# Get a photo of the current filter





# Where Does Filtration Fit In?

## Point of Use (POU) Filtration

Is an excellent solution for controlling Legionella and other bacteria in the potable water systems of hospitals, healthcare facilities and other residential buildings.

**Recommended for use in High risk areas for Hospital Acquired Infection such**

**as: Transplant - Oncology - Neonatal - ICU - Anywhere immunocompromised patients.**

The combination of Point of Use (POU) Filtration with Secondary Disinfection Chemical Treatment in a Definable Water Quality Plan can provide a more effective measure of safety than a standalone chemical disinfection program.

**Ice Machines**

**Water Management Plan (WMP) Contingency Response**

**Smaller facilities 75 bed or less**

**POU filtration provides immediate protection should legionella be detected**

**Allow facilities to continue operating if/while water use restrictions are in place**

# Review

- Legionella kills the weak and the elderly
- Water Management Plans Work
- A good plan and a good team can lower risk
- Point of Use can be a valuable tactic for Emergency/Contingency Planning and beyond

# References

- Legionella.org
- [www.cms.gov](http://www.cms.gov) – QSO-17-30
- ASHRAE.ORG – look for 188 standard
- CDC.Gov – <https://www.cdc.gov/legionella/wmp/toolkit/index.html>
- NY State - <https://regs.health.ny.gov/content/part-4-protection-against-legionella>
- Hcinfo.com/Blog
- Aquamedix.com/blog
- European Technical Guidelines for Prevention Control and investigation of Infections cause by legionella species - <https://ecdc.europa.eu/sites/portal/files/documents/Legionella%20GuidelinesFinal%20updated%20for%20ECDC%20corrections.pdf>
- Joint Commission EC 2.05.01 [https://www.jointcommission.org/assets/1/6/EC.02.05.01\\_Examples.pdf](https://www.jointcommission.org/assets/1/6/EC.02.05.01_Examples.pdf)
- <https://www.cdc.gov/healthywater/pdf/emergency/emergency-water-supply-planning-guide-2019-508.pdf>



## A COMBINATION CAN PROVIDE A MORE EFFECTIVE MEASURE OF SAFETY

Point of Use (POU) Filtration is an excellent solution for controlling Legionella and other bacteria in the potable water systems of Hospitals, healthcare facilities and other residential buildings.

Hospital-acquired Legionnaires' disease is directly linked to the presence of Legionella in hospital drinking water. Disinfecting the drinking water system is an effective preventive measure.<sup>1</sup> A number of Secondary Disinfection Chemical Treatment methods have been successfully used to disinfect or control potentially dangerous bacteria contamination like *Legionella* in the (Drinking) potable water systems of hospitals and other buildings. There are proponents and opponents of the different chemical disinfection methods and each method has its own concerns, gaps, strengths and weaknesses.

**The combination of Point of Use (POU) Filtration with Secondary Disinfection Chemical Treatment in a Definable Water Quality Plan can provide a more effective measure of safety than a standalone chemical disinfection program.**

**Point of Use (POU) Filtration can fill in the gaps of Secondary Chemical Treatment of Potable Water System in many situations:**

- When chemical concentration levels fall below required levels due to:
  - Control or Pumping system unable to keep up with water flow
  - Loss of adequate chemical treatment concentration in water as the water travels to distant points in the plumbing system
  - Low flow areas in the plumbing system where chemical treatment concentration can dissipate
  - Dead legs where no treatment chemicals have reached
- Low flow areas in the plumbing system still allow bacteria to propagate
- Cold water systems that are not treated
- *Legionella*, *Pseudomonas aeruginosa* and other bacteria can develop a resistance to chemical treatment
- Fewer safety and handling issues than chemical treatments.

**Typical areas where POU Anti-Bacterial Filtration is suited for:**

- High risk area for HAI (Hospital Acquired Infection)
  - Transplant
  - Oncology
  - Neonatal
  - Anywhere immunocompromised patients or visitors are present
- Areas of low water flow where chemical treatment concentrations are low
- In conjunction with flushing programs
- When Legionella or other Bacterial outbreaks occur
- Small Hospitals or Medical Facilities where no chemical program exists
- Hotels and Motels
- Adults, Senior Care & Long Term Care Facilities

\*All water treatment methods MUST be part of the definable Utility & Potable Water Quality Plan instituted by the facilities for the safety of their patients.

\*The CleanSpray micro filter membrane is compatible with common potable water treatment chemicals: chlorine, chlorine dioxide, and copper- silver ions.

<sup>1</sup> Lin YS, Stout JE, Yu VL, Infect Control Hosp Epidemiol 2011;32(2):166-173, Controlling Legionella in Hospital Drinking Water: An Evidence-Based Review of Disinfection Methods

## EXECUTIVE SUMMARY

The United States federal and state regulatory landscape associated with water treatment products and technologies is complex, ever changing and unforgiving. Water treatment technologies are regulated across a spectrum of federal, state and local laws. From a federal perspective, there is often the misunderstanding that water treatment technologies are regulated primarily under the Safe Drinking Water Act or the Clean Water Act. However, products and technologies that control “pests”, such as bacteria, fungi, algae, protozoa or slime, are also regulated under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). FIFRA is administered by the U.S. Environmental Protection Agency (EPA) Office of Pesticide Programs. It is important that Water Quality Association (WQA) members understand that certification to NSF/ANSI standards does not exempt water treatment products from FIFRA obligations.

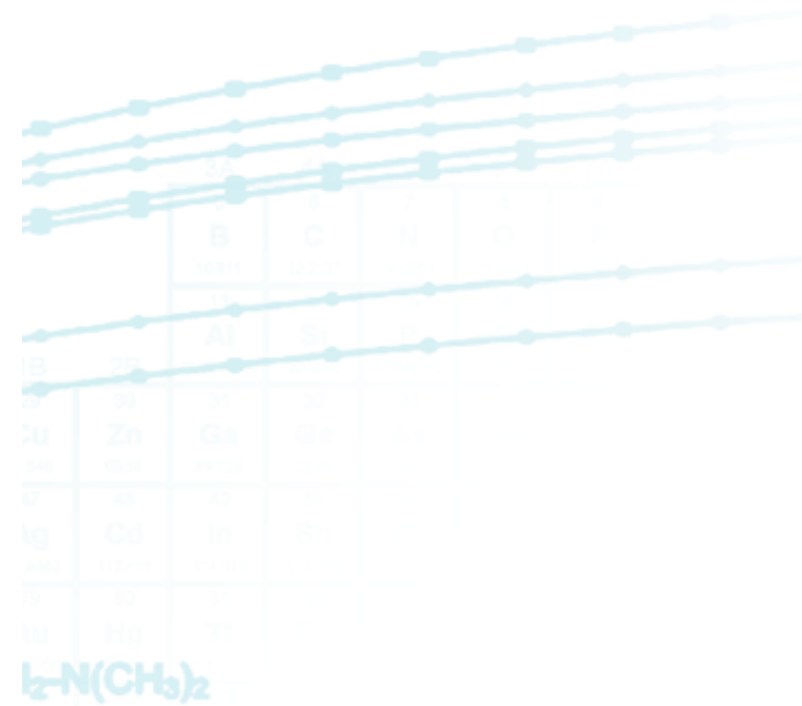
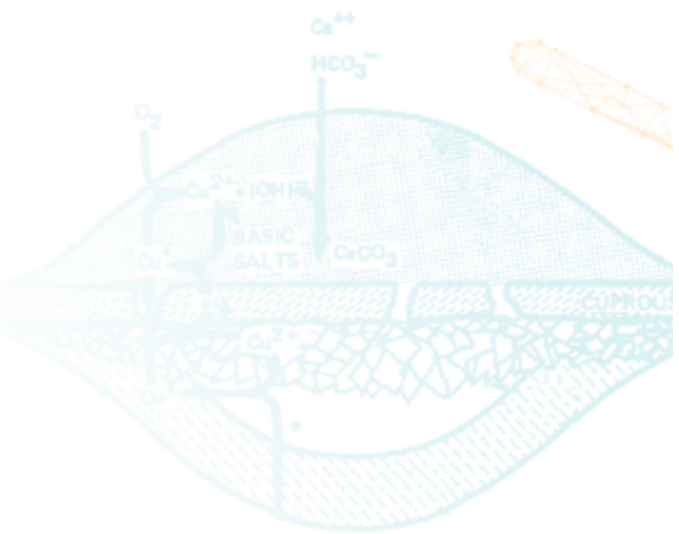
FIFRA regulates “antimicrobial pesticides” and “antimicrobial pesticidal devices” intended to:

- Disinfect, sanitize, reduce, or mitigate growth or development of microbiological organisms; or
- Protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime;

Therefore, products and technologies intended to provide microbiological mitigation used in human drinking water systems, industrial processes and water systems, swimming pools and other aquatic areas are regulated under FIFRA, with specific requirements for self-compliance or registration dependent upon the mitigation methods. It is important for Water Quality Association members to understand there are a number of regulatory obligations associated with the manufacture, sale, distribution, use, and marketing of products used to treat water under FIFRA. The EPA considers these types of products to be pesticide products or pesticidal devices.

This guidance document will provide an overview of the regulatory obligations associated with these types of water treatment products and technologies to assist members in meeting their compliance objectives.

This document was prepared in consultation with Technology Sciences Group Inc. (TSG). TSG is a multinational consulting firm that provides regulatory and scientific consulting services to assist companies with state, national and international compliance needs. Specifically, TSG can assist WQA members with issues associated with FIFRA compliance as presented in this document. Inquiries should be directed to Erin Tesch at [etesch@tsgusa.com](mailto:etesch@tsgusa.com) or (202) 828-8966.



## Temperature Requirements

- 35 - 46°C (95 - 115°F): Optimum temperature range for growth
- Below 20°C (< 68°F): Predominantly dormant but viable
- Above 50°C (>122°F): 90% kill rate in 2 hrs
- Above 60°C (>140°F): 90% kill rate in 2 min
- Above 70°C (>158°F): 100% rapid kill



Optimal temperature range for growth of *Legionella* (20°C - 50°C)



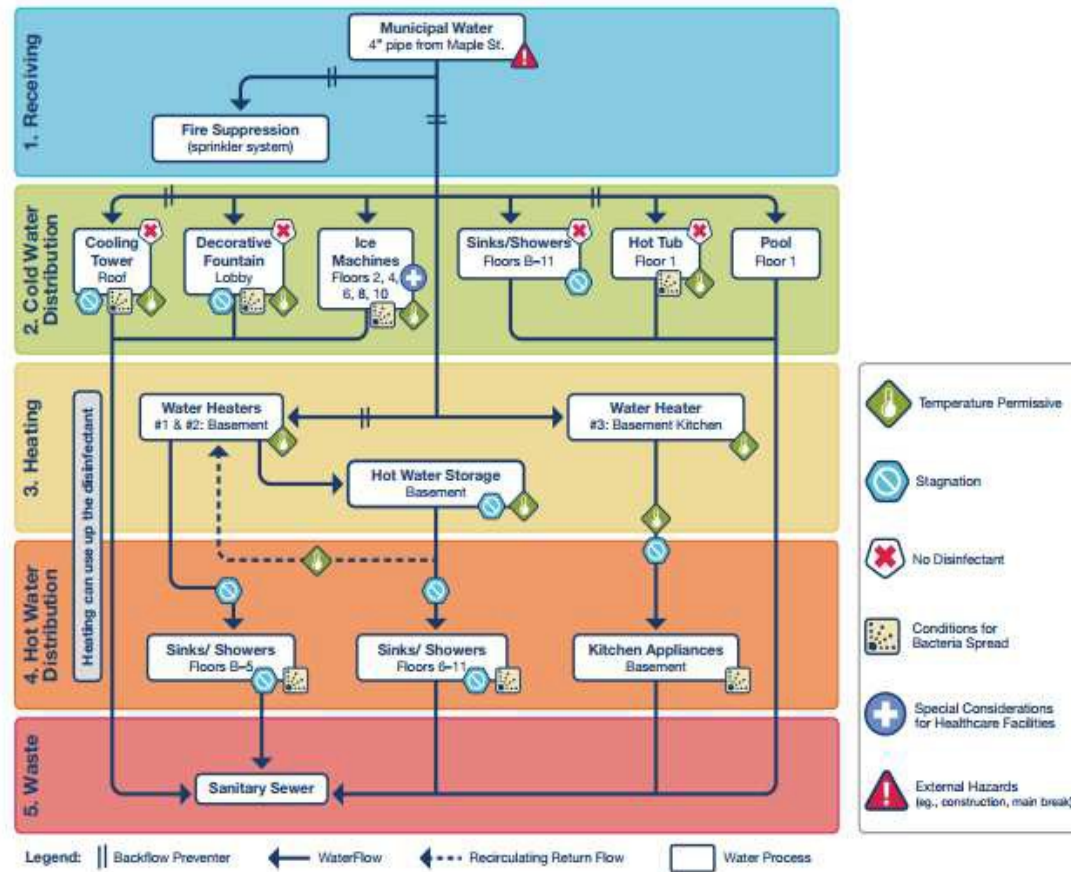
# Long Term Measures

- Routine Flushing
- Silver/Copper ionization
- Low level chlorination
- Chlorine dioxide
- Mono Chloramines
- Also
  - Anti Scald valves – minimum return temp of 124
  - Periodic superheating and flushing
  - Hot water tanks with instantaneous heaters
  - Periodically flushing to improve existing treatment
  - For a full list – NY State Department of 2019 Doc

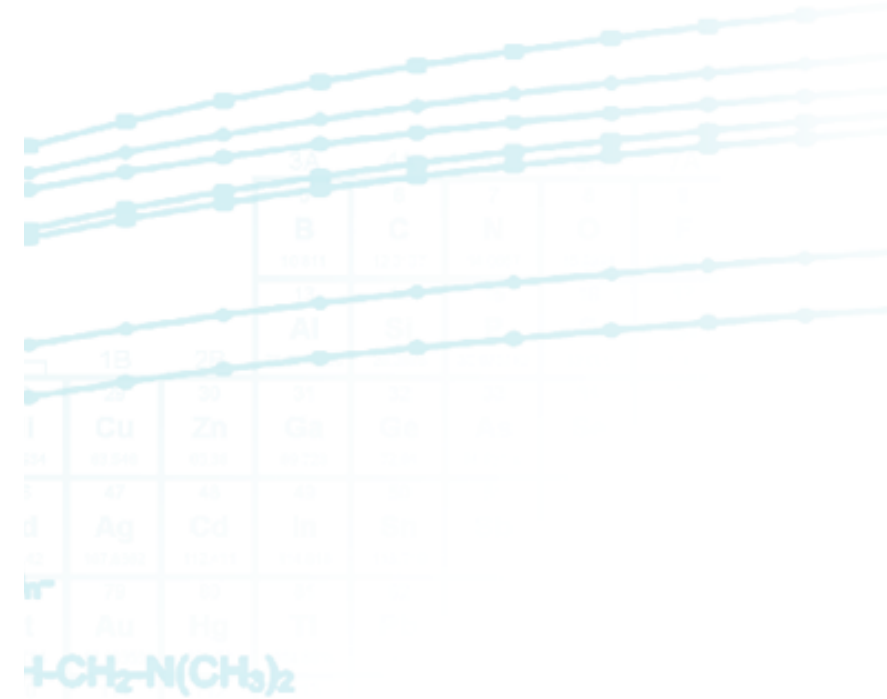
## Guidelines and Regulations

- CDC Review and Toolkit
  - “Vital Signs” review – June 2016
  - Toolkit for Water Management Programs (June 2016 updated in June 2017)
- ASHRAE
  - ANSI/ASHRAE Standard 188-2015 (Legionellosis: Risk Management for Building Water Systems), updated 2018
  - ASHRAE Guideline 12-2000R (updated Draft for public review posted Nov 2018)
- European Guidelines (June 2017)
  - European Technical Guidelines for the Prevention, Control and Investigation of Infections caused by *Legionella* species
- New York Regulations (2016)

# Water Systems – Diagram



<https://www.cdc.gov/legionella/downloads/toolkit.pdf>



# EWGLI\* rules of thumb

Legionella bacteria CFU per Liter	Action Required
>100 to 1000	Alert Team, check control measures
Above 1,000 & Less than or equal to 10,000	If 10 – 20% samples positive: Re-sample, Review control measures, Perform Risk Assessment. If most samples are positive – Consider Disinfection
>10,000	Resample, review control procedures, risk assessment, determine whether disinfection of whole system or affected area
	<b>Cooling Towers</b>
>1000 less than 10,000	Review Program Operation, Control measures. Perform risk assessment to identify potential remedial action
>10,000	Risk Assessment and take corrective action





# Thank you

Any further information/questions please feel free to stop at our booth in the exhibit hall or contact our office.

J. Brady Benson

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[bbenson@aquamedix.net](mailto:bbenson@aquamedix.net) [www.aquamedix.com](http://www.aquamedix.com)

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