

Control Measures to Mitigate Risk



Bill Pearson
BPEARSON Consulting LLC

WATER SAFETY (RISK) MANAGEMENT STEPS









ROLES & RESPONSIBILITIES

WRITING THE SUMMARY DESCRIBE THE BUILDING

IDENTIFY RISK









DOCUMENTATION



RESOURCES & TOOLS



ASHRAE 188 WMP Core Elements:

4. ID Controls

PROGRAM TEAM—Identify persons responsible for Program development and implementation.

DESCRIBE WATER SYSTEMS/FLOW DIAGRAMS—Describe the potable and nonpotable water systems within the building and on the building site and develop water-system schematics.

ANALYSIS OF BUILDING WATER SYSTEMS—Evaluate where hazardous conditions may occur in the water systems and determine where control measures can be applied.

CONTROL MEASURES—Determine locations where control measures must be applied and maintained in order to stay within established control limits.

MONITORING/CORRECTIVE ACTIONS—Establish procedures for monitoring whether control measures are operating within established limits and, if not, take corrective actions.

CONFIRMATION—Establish procedures to confirm that

- the Program is being implemented as designed (verification), and
- the Program effectively controls the hazardous conditions throughout the building water systems (validation).

DOCUMENTATION—Establish documentation and communication procedures for all activities of the Program.





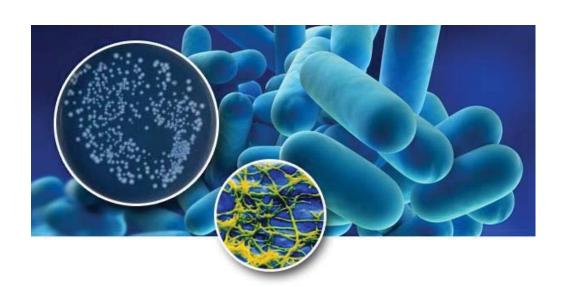
General Principles of effective water management:

- Maintaining water temperatures outside the ideal range for Legionella growth – Hot/Hot! & Cold/Cold!
- Preventing water stagnation
- Ensuring adequate disinfection
- Maintaining devices to prevent scale, corrosion, and microbial growth (biofilm), all of which provide a habitat and nutrients for Legionella
- ➤ Once established, water management programs require **regular monitoring** of key areas for potentially hazardous conditions and the use of **predetermined** action responses to remediate such conditions if the team detects them.





Legionella Bacteria are ...



Very, very, very, very ... small bacteria

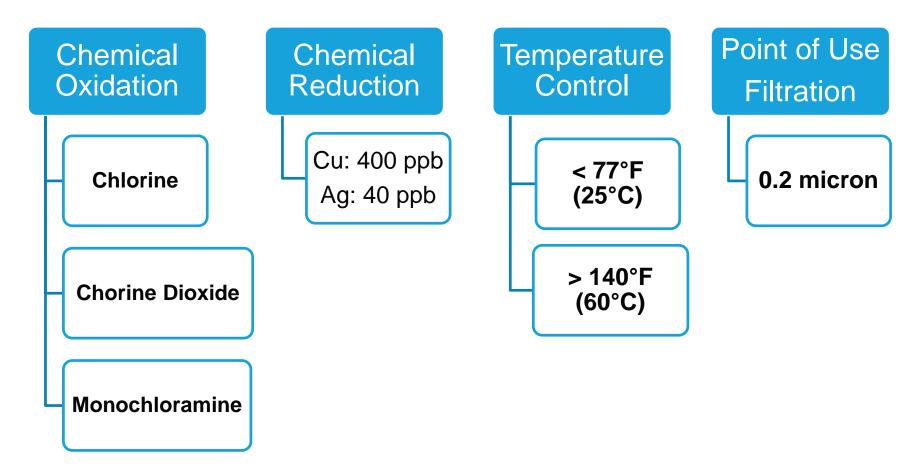
0.3–0.9 μm (by) 2–20 μm

What filter size would you use for a Legionella control strategy?





Risk Mitigation: Secondary Disinfection





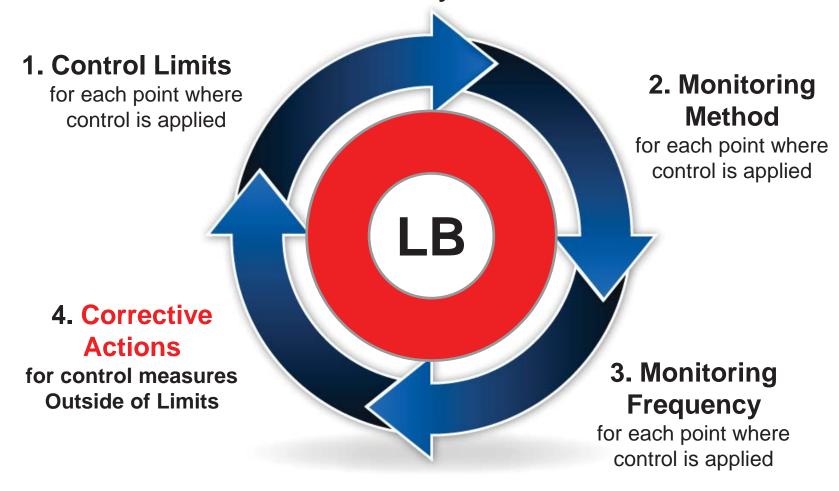
Secondary Disinfection Methods

- Thermal shock treatment (Heat & Flush)
- Shock Chlorination: >10
 ppm free residual, may
 require water tanks to be
 25-50 ppm
- Continuous Supplemental
 Chlorination (1-4 ppm)
- Copper-Silver ionization (continuous) (400/40 ppb)
- Chlorine Dioxide (ClO₂)
- Monochloramine (continuous)
- Point-of-use Filtration





Establish for Every Control Measure







Summary:

- Control measures to mitigate risk is the heart of a WSM plan and the key to preventing Legionellosis
- The Team shall determine the control measures to be maintained, including: preplanning of physical design & equipment siting, treatment methods, and all aspects of monitoring to maintain the proper (safe) chemical and physical conditions of the water.
- Establish for every control measure: location, limits, monitoring methods & frequency as well as corrective actions for control measures outside of control limits.
- Document, Document and Document everything!

