



ANSI/ASHRAE Standard 188-2015 Webinar

April 14, 2016

Presented by:

Joe Russell, President

Slides Adapted from:

- ANSI/ASHRAE Standard 188-2015
“An Overview for the Water Treatment Professional”
Presented by: Bill Pearson from Southeastern Laboratories, Inc.
September 11, 2015
www.selaboratories.com
- ANSI/ASHRAE Standard 188-2015
“Responsibilities, Liabilities & Opportunities”
Presented by: Matt Freije from HC Resource Information, Inc.
August 18, 2015
www.hcinfo.com
- ASHRAE Standard 188 (LB)
“Overview for the Water Treatment Professional”
Presented by: Bill Pearson & Matt Freije
September 9-12, 2015 at the Omni Hotel & Music Center, Nashville, TN

Introduction to Legionella & Legionnaire's Disease



American Legion Convention, PA July 1976:



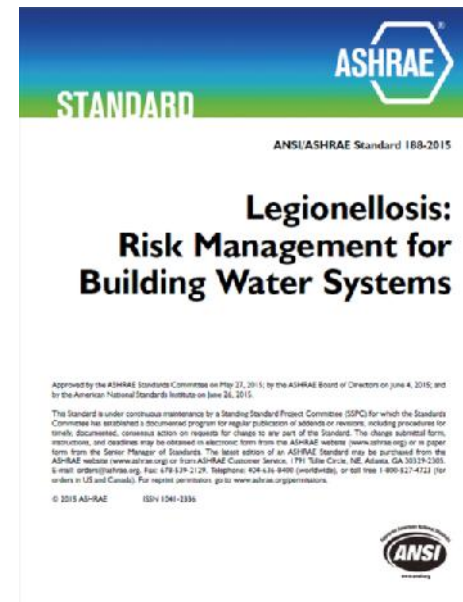
Associated Press

A snapshot from an American Legion convention in Philadelphia in July 1976. Within a month, an infectious disease killed two of these men.

Final Case Count = 221 cases
Deaths = 34

Summer of 2015 – The Perfect Storm:

- June 26, 2015
- ANSI/ASHRAE Standard 188-2015 is Published!



Legionella Outbreak – New York, NY:



- August 11, 2015
- 128+ cases reported
- 12 deaths



San Quentin State Prison – California



- August 31, 2015
- 6 Diagnosed Cases
- 95 under surveillance

SACRAMENTO, Calif. – At least six San Quentin State Prison inmates were ill with Legionnaires' disease and dozens more under observation Sunday, prompting a weekend halt to visitors, no hot meals and limited drinking water supplies at California's oldest prison.

At least 51 inmates are under observation for respiratory illness at the prison's medical unit, said Dana Simas, a spokeswoman with the California Department of Corrections and Rehabilitation.

Illinois Veterans Home – Quincy, IL



- 54 Reported cases
- 13 deaths

WLS

Thursday, September 17, 2015 12:34PM

QUINCY, Ill. (WLS) -- As of Thursday, 54 people from the Illinois Veterans' Home-Quincy have tested positive for Legionnaires' disease, the Illinois Department of Veterans' Affairs says. That count includes 12 resident deaths and one non-resident death.

The state Department of Veterans' Affairs on Tuesday reported the 13th death from the water-borne illness.

Three Elgin, IL Schools Closed

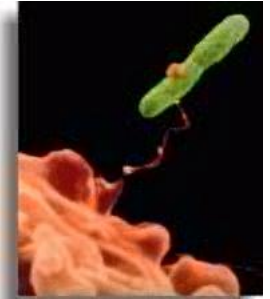


- September 23, 2015

Three schools in Illinois' U-46 school district, which covers 11 communities in Cook, DuPage and Kane counties, shut down Wednesday after test results showed "higher than normal levels of Legionella bacteria," the district said.

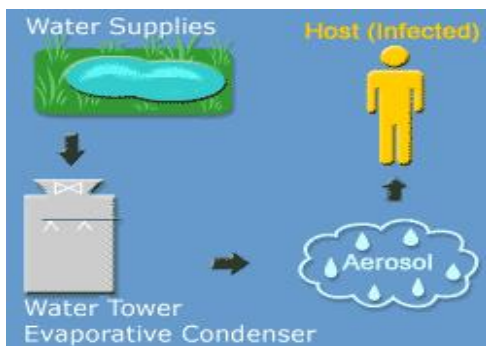
Microbiological Background

- Legionella, is a gram negative, aerobic, waterborne pathogen that causes Legionnaires' disease - a serious but preventable form of pneumonia, as well as Pontiac Fever, a flu-like illness.
- The Legionella family encompasses more than 50 bacterial species, 20 of which are known to be associated with human infection. (90% of cases are from *L. pneumophila*, serogroup 1)
- Legionella is estimated to be present in up to 70% of all building water systems.

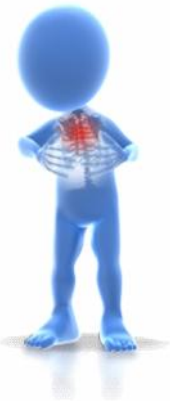


How Does One Get Legionnaire's Disease?

- Aerosolized water droplets containing Legionella bacteria are inhaled.
- Contaminated respiratory therapy equipment.
- Aspiration of contaminated water.



Morbidity and Mortality



- According to Tom Watson, chair of the committee that wrote that Standard 188-2015
 - 8,000 to 10,000 cases of Legionnaires Disease are reported annually in the United States
 - More than 10% of those cases are fatal
 - This disease poses a real public health threat!!



How Will Legionnaires' Disease be Controlled in the US?

- ✗ President Obama Mandates a New Prevention Plan ...and makes it part of the economic stimulus package?
- ✗ Everyone Voluntarily Begins to Test and Treat Water Systems to Control Legionella?
- ✓ New Directives and Standards are Enacted that Require Hospitals and Building Owners to Address Legionella in Building Water Systems

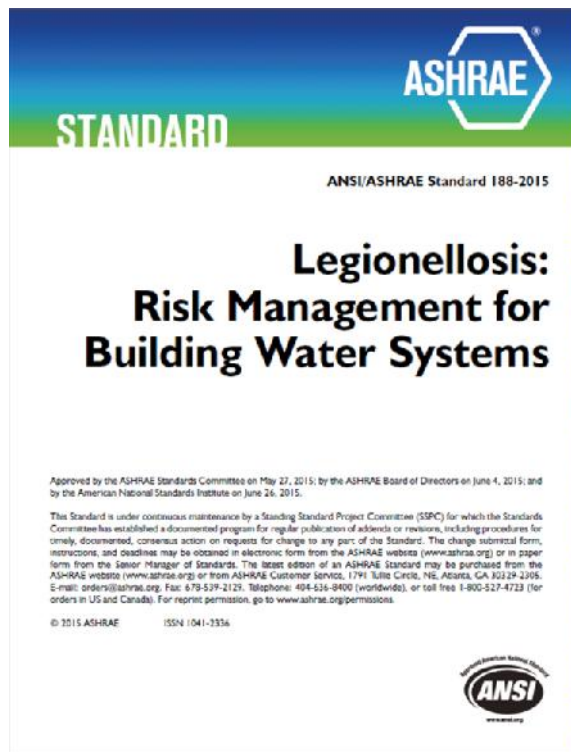
Questions?



New ANSI/ASHRAE Standard 188-2015



In 2015 a New ANSI/ASHRAE Legionella Standard – Ready or Not



American Society of Heating, Refrigerating and Air Conditioning



Shaping Tomorrow's
Built Environment Today

- ASHRAE, founded in 1894, is a building technology society with more than 54,000 members worldwide. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability within the industry. Through research, standards writing, publishing and continuing education, ASHRAE shapes tomorrow's built environment today. ASHRAE was formed as the American Society of Heating, Refrigerating and Air-Conditioning Engineers by the merger in 1959 of American Society of Heating and Air-Conditioning Engineers (ASHAE) founded in 1894 and The American Society of Refrigerating Engineers (ASRE) founded in 1904.

Where to get ANSI/ASHRAE Standard 188-2015?

- Standard 188 can be purchased from ASHRAE at:

<http://www.techstreet.com/ashrae/products/1897561>

- Standard 188 can be read for free from ASHRAE website under the preview ASHRAE Standards (bottom left of page) at:

www.ashrae.org/standards



ASHRAE's 3 Types of Voluntary Consensus Standards

ASHRAE develops three types of **voluntary consensus standards** accredited by the American National Standards Institute (ANSI):

- 1) Method of Measurement or Test
- 2) Standard Design
- 3) Standard Practice

- ▶ 188 is a 'Standard Practice' with Design considerations.
- ▶ 188 is written in code-ready language – thus, is readily adoptable to be written into codes or related regulations or legislation!

ASHRAE Standards – Special Note

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus Standard developed under the auspices of ASHRAE. *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this Standard as an ANS, as “substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.” **Compliance with this Standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.**

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for

- a. interpretation of the contents of this Standard,
- b. participation in the next review of the Standard,
- c. offering constructive criticism for improving the Standard, or
- d. permission to reprint portions of the Standard.

‘Compliance with this Standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.’

*[Overview for the Water Treatment Professional](#), Bill Pearson & Matt Freije, September 9-12, 2015 at the Omni Hotel & Music Center, Nashville, TN

ASHRAE Legionella Standard Adopted in New York Following Outbreak

August 17, 2015

Contact: Jodi Scott

ASHRAE Public Relations

678-539-1140 / jscott@ashrae.org

ATLANTA – With 12 confirmed dead and more than 120 cases of infection due to legionellosis, New York City Council on Thursday adopted legislation that requires adherence to part of ASHRAE’s newly published *Legionella* standard.

The legislation addresses registration and inspection of cooling towers. It requires owners to create and file a plan to maintain equipment to comply with **Sections 5, 6 and 7.2** of the **ANSI/ASHRAE Standard 188-2015 / *Legionellosis: Risk Management for Building Water Systems***.

American Society of Heating, Refrigeration & Air Conditioning Engineers



ANSI/ASHRAE Standard 188-2015

Legionellosis: Risk Management for Building Water Systems

Approved by the ASHRAE Standards Committee on May 27, 2015; by the ASHRAE Board of Directors on June 4, 2015; and by the American National Standards Institute on June 26, 2015.

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 or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. The change submittal form, instructions, and details may be obtained in electronic form from the ASHRAE website (www.ashrae.org) or in paper form from the Director, Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-875-2129. Telephone: 404-875-6100 (toll-free), or toll-free 1-800-527-1123 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

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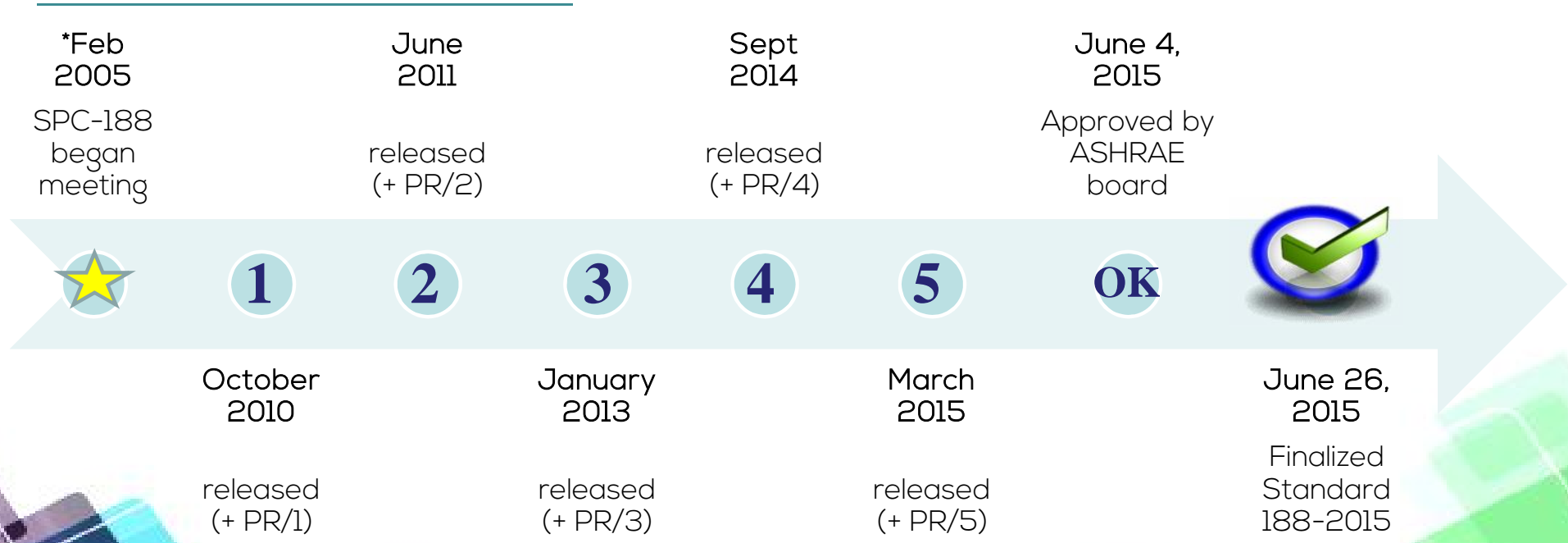


ASHRAE

... dedicated over 10 years
to writing the 188 *Legionella*
Standard!

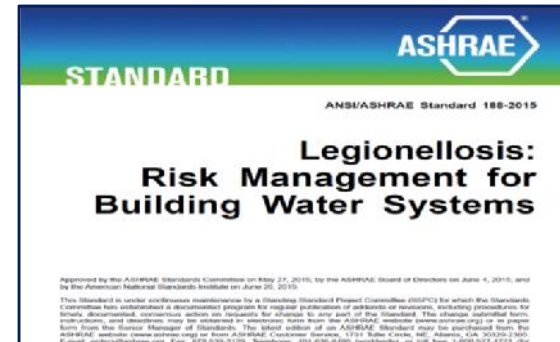
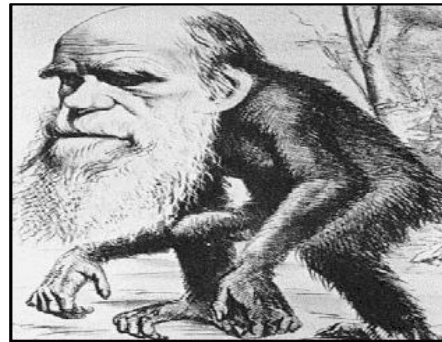
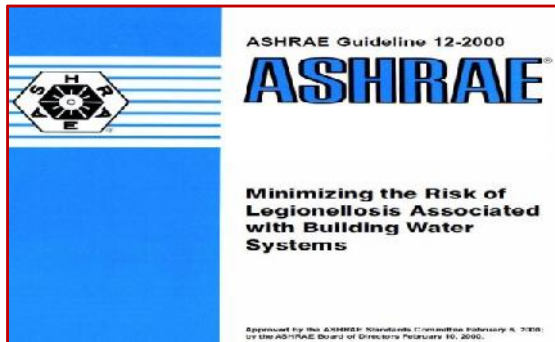
*Overview for the Water Treatment Professional, Bill Pearson & Matt Freije, September 9-12, 2015 at the Omni Hotel & Music Center, Nashville, TN

ASHRAE Legionella Standard Adopted in New York Following Outbreak



*Feb 2005: 1st meeting was GPC-12 (guideline), later as SPC-188
 PR = Public Reviews (required by the ANSI/ASHRAE process)

Standard 188 'Evolved' From ASHRAE Guideline 12

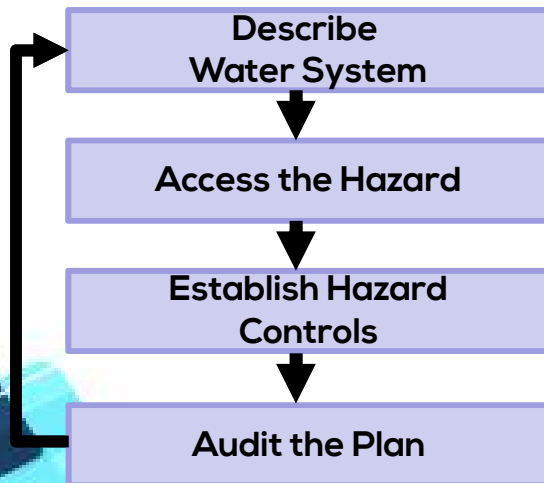


*Overview for the Water Treatment Professional, Bill Pearson & Matt Freije, September 9-12, 2015 at the Omni Hotel & Music Center, Nashville, TN

Compliance with Standard 188



In a Nutshell: Compliance with Standard 188 will require facility owners (managers) to:



1 → Establish a Team w/assigned responsibilities & accountabilities

2 → Have, Practice, & Audit a Water Management Plan for legionellosis risk management of their building water systems

ANSI / ASHRAE 188-2015: Control Measures

188 provides a framework, but the **Team** must develop control measures, as applicable for . . .

- New Construction
- Siting
- Startup and Shutdown
- Inspections
- Maintenance
- Cleaning and Disinfection
- Monitoring (e.g., temperatures; disinfectant levels)
- Water Treatment
- Responding to Legionnaires' disease



188 Person Committee

ASHRAE Standing Standard Project Committee 188
Cognizant TC: Environmental Health Committee
Co-cognizant TCs: 3.6, Water Treatment; and 6.6, Service Water Heating Systems
SPLS Liaison: Patricia Graef
ASHRAE Staff Liaison: Stephanie Reiniche

<p>Thomas E. Watson,* <i>Chair</i> Paul A. Lindahl, Jr.,* <i>Vice-Chair</i> Michael P. Patton,* <i>Secretary</i> Stu Asay* Clive R. Broadbent* Helen R. Cerra* Steven Cutter* John D'Angelo, Jr.* Peter DeMarco* Linda L. Dickey* Charles E. Dorgan* Sara Ferrari* Katherine K. Flamm* William A. Gaines, III* Carolyn Gilliland* Patricia T. Graef* Tim Keane*</p>	<p>▶ Clarena Lucas* ▶ Scott E. Mayes* ▶ Clifton McClellan* ▶ William F. McCoy* ▶ Richard D. Miller* ▶ R. Lee Millies, Jr.* ▶ Eric R. Myers* ▶ Amy Nichols* ▶ Richard J. Pearson* ▶ William E. Pearson, II* ▶ Billy Smith* ▶ Alan Spence* ▶ Janet E. Stout* ▶ Walter N. Vernon* ▶ Ronald E. Wood* ▶ Jon J. Cohen ▶ Todd Cornwell</p>	<p>▶ Robert J. Cunningham, III David F. Geary Ronald George ▶ Joseph M. Hannigan, Jr. Lauri Hicks Thomas W. Johnson Sergio La Mura David F. Geary Frank Myers Patrick L.P. Racine Patsy Root Aaron Rosenblatt Kevin A. Scarlett Leon Shaprio Matt Sigler Wayne R. Thomann Alain Trahan</p>
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* Denotes members of voting status when the document was approved for publication

There were 32 voting members, 7 Professional Organizations and many other active professional contributors to the Standard 188 committee

Voting Member Professional Organizations on Standard 188 Committee Include

- 1)* **CDC:** *Centers for Disease Control & Prevention*
- 2)* **AWT:** *Association of Water Technologies*
- 3) **ASHE:** *American Society for Healthcare Engineering*
- 4) **APIC:** *Association for Professionals in Infection Control and Epidemiology*
- 5) **ASPE:** *American Society of Plumbing Engineers*
- 6) **IAPMO:** *International Association of Plumbing and Mechanical Officials*
- 7) **NSF** International

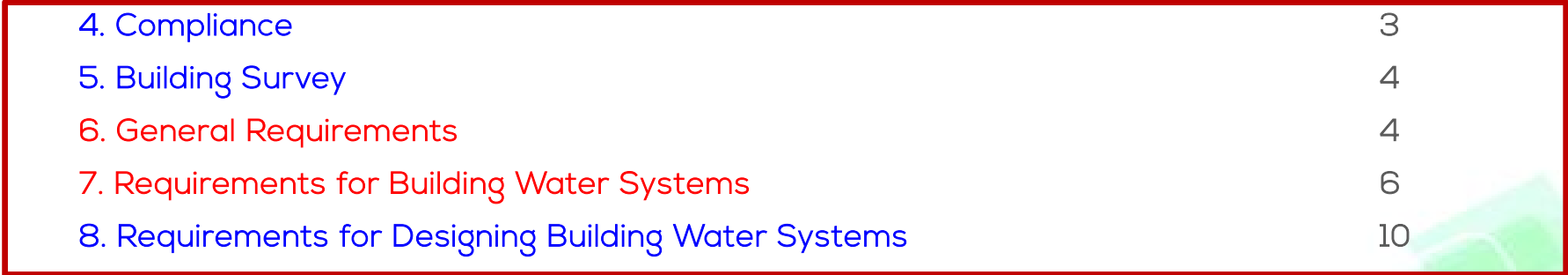
* Represented when committee first formed (2005)



Sections 4-8 of Standard 188

SECTION	PAGE
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WMP →



What is the Purpose of ASHRAE Standard 188-2015?

▶ **Purpose:** Establish minimum *Legionellosis* risk management requirements for *building water systems*.

▶ **Scope:**

1) ... for design, construction, commissioning, operation, maintenance, repair, replacement, and expansion of new and existing buildings and their associated water systems

2) ... applies to human-occupied commercial, institutional, multiunit residential, and industrial buildings. Does not include single-family residential buildings

3) ... for use by owners and managers of human-occupied buildings, excluding single-family residential buildings. Also intended for those involved in the design, construction, installation, commissioning, operation, maintenance, and service of *centralized building water systems* and components

Section 4: Compliance

- 4.1 Building Designer Requirements
(compliant survey per Sec.5; comply w/Sec.8)
- 4.2 Building Owner Requirements
(compliant survey per Sec.5; comply w/Sec.6 & 7)
- 4.3 Health Care Facility Requirements
Don't comply – Section 4.2, 6 and 7.
Comply – Sec. 4.2, 6 & 7 OR with Annex A)

188 compliance requires Section 5 surveys be repeated (at least) annually, with results documented & available for review at any time.

Section 4: Compliance

4.3 Health Care Facility Requirements – Cont'd.

Compliance with Section 4.3.2

- Facility is accredited by a regional, national or international accrediting agency or by the *authority having jurisdiction (AHJ)* over the health care facility Infection Prevention and Control activities
- The health care facility IC program has an infection preventionist that is certified in infection prevention control (CIC) or has an epidemiologist with a minimum of a masters degree of equivalent

Section 5: Building Survey

5.1 Determine whether it has one or more:

(a)... cooling towers or evaporative condensers that provide cooling and/or refrigeration for the HVAC&R system or other systems;

(b)... whirlpools or spas either in the building or on site;

(c)... ornamental fountains, misters, atomizers, air washes, humidifiers, or other *nonpotable* water systems or devices that release water aerosols in the building or on the site.

ANSI/ASHRAE 188-2015: Water Management Program (WMP)

Implement for ...

- Cooling Towers
- Whirlpool Spas
- Ornamental Fountains
- Misters, Air Washers, Atomizers, Humidifiers
- Other Devices that release water droplets
- And for Potable plumbing systems if...



Section 5: Building Survey

5.2 Determine whether it is characterized by one or more of the following risk factors that relate to legionellosis:

(a)... multiple housing units with one or more centralized hot water systems;

(b)... more than 10 stories high (including levels below grade);

(c)... health care facility where patient stays exceed 24 hours;

(d-e)... an area housing or treating occupants with certain medical conditions or risk factors: burns, chemotherapy, solid organ or bone marrow transplantation, immunocompromised, at-risk, with renal disease, diabetes, or chronic lung disease;

(f)... identified as housing for occupants over the age of 65.

Implement a WMP for Plumbing Systems if a Building has ANY ONE of the Following:

- Multiple housing units with a centralized hot water system/s
- More than ten stories
- Housing designated for people over age 65
- Patients staying > 24 hours
- An area housing or treating people with certain medical risk factors...



Implement a WMP for plumbing systems if a Building has an Area for Housing or Treating People

- For burns, cancer-chemo, solid organ or bone marrow transplant
- That are immunocompromised or otherwise more susceptible than the general population because of age, health, drug treatment, medication, smoking, or other issues
- That have renal disease, diabetes, or chronic lung disease



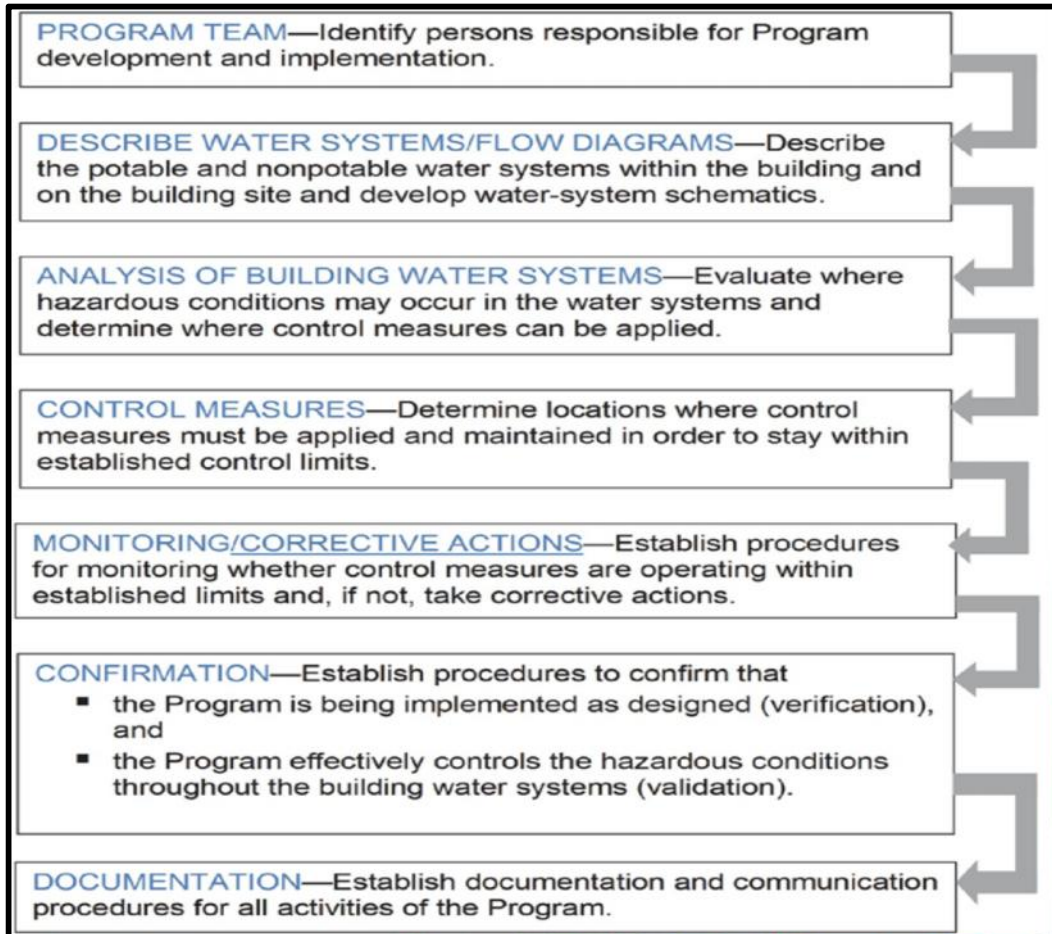
Section 6: General Requirements

- 6.1 Principles of a Water Management Program
6.1.1-6.1.7: outline of risk management principles

- WMP** → 6.2 Program Development
6.2.1-6.2.9: detail management program development



Elements of a Water Management Program (WMP)



For Each Control Point ESTABLISHED

1. Control Limits
for each control point
where LB control is
applied

2. Monitoring Method
for each control point
where LB control is
applied



4. Corrective Actions
to be undertaken when
control measurement is
Out of Limits

3. Monitoring Frequency
for each control point
where LB control is
applied

Verification & Validation

Water Management Plan: VERIFICATION →

The process and evidence used to support that compliance with the Plan is being done – i.e. record-keeping of control monitoring, process procedures and other evaluations. It ensures that the Water Management Plan is being correctly followed in practice;

... “Are you Doing what you Planned to Do?”

Water Management Plan: VALIDATION →

The process and evidence used to support that the hazard control elements of the plan are effective. Testing for the control of the hazard or assessment of technical, scientific, medical and other data that can be used to show that control measures for the hazard are effective – i.e. no *Legionella*, no legionellosis;

... “Are you Doing the Right Thing – Does it Work?”

Section 7: Requirements for Building Water Systems

- 7.1 Potable Water Systems
- 7.2 Cooling Towers & Evaporative Condensers
- 7.3 Whirlpool Spas
- 7.4 Ornamental Fountains & Other Water Features
- 7.5 Aerosol-Producing Misters, Atomizers, Air Washers and Humidifiers

Section 7 is clearly the more extensive & detailed part of the standard – detailing the various potable and nonpotable waters system requirements

Section 8: Requirements for Designing Building Water Systems

- 8.1 General
- 8.2 Final Installation Documents
- 8.3 Balancing
- 8.4 Commissioning

Section 8 deals with Legionellosis hazard considerations and documentation required when designing for new construction, renovations, refurbishment, replacement, or repurposing of a facility.

ASHRAE Standard 188: Designers Must Provide Documents, Drawings & Instructions for....



- Monitoring and Control
- Code Compliance
- Operation and Maintenance
- Control System Operation
- Calibration
- Installation and Start-up
- Commissioning (including Flushing and Disinfection)
- Filling and Draining
- Equipment Sizes
- Piping Layout
- System Materials
- Pipe Sizes
- Design Flow Rates
- Design Temperatures
- Impact of Heat Loss or Gain

ASHRAE Standard 188: Designers Must Note Locations of....



- Equipment
- Access (or note inadequate access)
- Filling and Draining
- Flushing
- Sampling
- Temperature monitoring
- Treatment
- No flow & Low Flow areas
- Outside Air Intakes
- Possible Cross Connections

ASHRAE Standard 188: Prior to Occupancy

- Balance the Water Systems
- Disinfect and flush no more than 3 weeks before any part of the building is occupied for its intended purpose



ASHRAE Standard 188: Normative Annex A – Health Care Facilities

- A1 – Definitions
- A2 – Designated Team
 - Senior Leadership, Facilities, Infection Control
- A3 – Water System Flow Diagram
- A4 – Risk Management Plan
 - Hazard analysis, control locations, limits, monitoring procedures and corrective actions, verification, validation.
- A5 – Existing Buildings, New Construction and Renovations
- A6 – Building Water System Procedures
 - Start-Up/Shutdown, Maintenance, Water Treatment

Questions?



WMP Good Practices



Process vs. Practice

Risk Management Process (to comply w/ASHRAE 188)

***GOOD

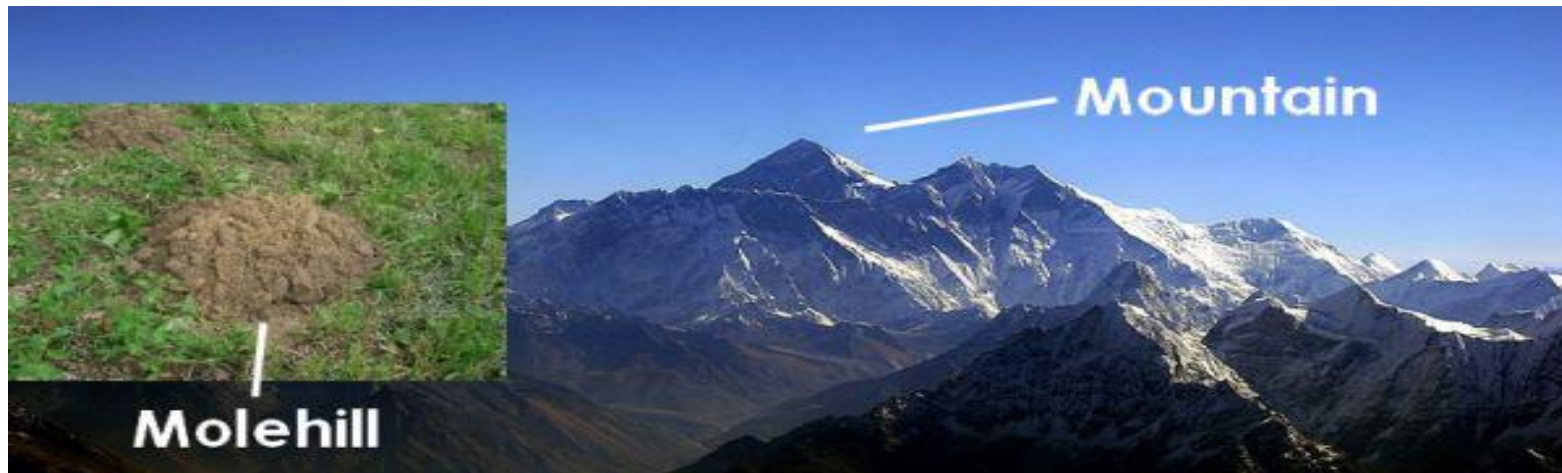
Water Treatment Practices

- 1: Water system survey for (LB) **hazard analysis and process flow diagrams**
- 2: Determine **control points** and control strategy where the hazard (LB) can be controlled in the system
- 3: Establish **control limits** for each control point
- 4: Establish **monitoring** protocol and frequency for hazard control
- 5: Establish **corrective actions** for out of control monitoring results
- 6: Establish **record-keeping** & program documentation procedures
- 7: Establish **verification & validation** procedures

- 1: **Facility Survey of water treatment systems** (w/process flow diagrams)
- 2: Recommend a chemical treatment program with feed, monitoring & **control procedures for each point**
- 3: Establish recommended **control limits** for each control point
- 4: Establish **monitoring/testing** protocol and frequency for the WTP
- 5: Establish **corrective actions** for out of control monitoring results
- 6: Establish **record-keeping** & program documentation procedures
- ***7: Establish **verification & validation procedures**

Water Management Plans . . . Simply Put

Don't Make a Mountain Out of a Molehill!



Water Management Plans should be thorough – but **KISS** (keeping it simple) should be more than adequate to complete the task!

For More Information from ASHRAE

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Opportunities & Liabilities

Facility Owners & Operators

- Did you have a comprehensive WMP for Legionella control?
- Did you fully implement the control measures?
- How well did you validate it?
- Did you make appropriate adjustments based on test results?

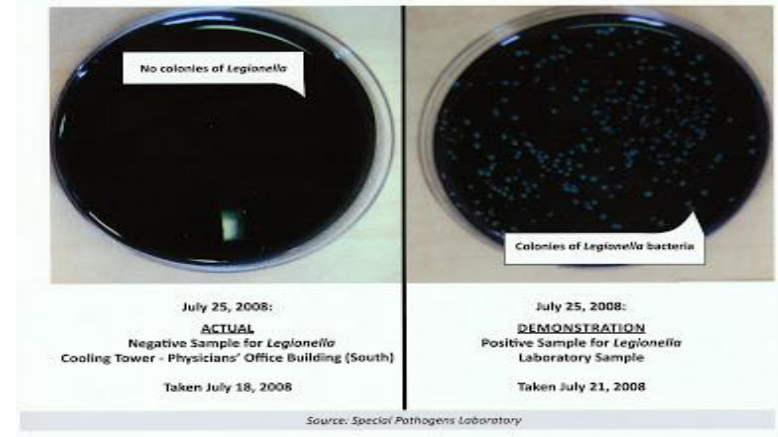


Validation is the Key to Success!

Culture Test is Gold Standard

Culture Results Tell You:

- Species & serogroup is present
- Informs diagnostic options (Urine antigen for *L. pneumophila* serogroup 1 only)
- Verifies efficacy of disinfection efforts
- Samples should be sent to an Elite certified lab



How can Watertech Help?

Provide complete water treatment solutions for Legionella control in cooling towers, air washers, evaporative condensers and potable water.

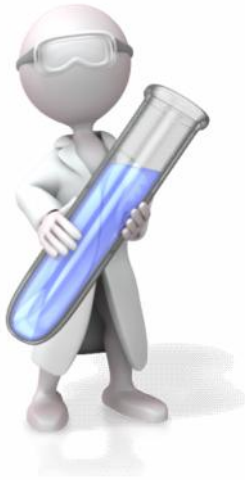
Help with ASHRAE Standard 188 Compliance

Watertech of America, Inc. is here as a resource to assist your facility in obtaining and implementing all parts of the WMP. We have partnered with HC Info, a leading Legionella Consulting group, to assist customers in development of a WMP.

Watertech of America, Inc. offers the following:

- Membership on your Program Team
- Full Development of Water Management Program
- Monitoring
- Corrective Actions
- Legionella Testing
- Online Documentation and Recordkeeping

More Information – Contact Us



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