

NY State implementation and ASHRAE standard for Building Water Systems

Managing Legionella risk at a large urban biomedical
university.

Christopher Aston, Ph.D.

Manager of Biological Safety Programs

Columbia University

June 9 2016 – MABSA Symposium

Topics

1. What is Legionella?
2. What makes Columbia special?
3. What was happening before the NYS/NYC mandates?
4. What was required for compliance with the mandates?
5. Inspections
6. Ongoing maintenance and risk management
7. Successes/lessons learned
8. Other issues

Topics

1. What is Legionella?
2. What makes Columbia special?
3. What was happening before the NYS/NYC mandates?
4. What was required for compliance with the mandates?
5. Inspections
6. Ongoing maintenance and risk management
7. Successes/lessons learned
8. Other issues

What is Legionella?

- Ubiquitous aquatic bacteria that grows in biofilms
- Grows in building cooling tower sumps/hot tubs
- Also found in potable water
- Causes legionellosis (pneumonia) in immunocompromised people
- Monitoring and control measures required



Topics

1. What is Legionella?
2. **What makes Columbia special?**
3. What was happening before the NYS/NYC mandates?
4. What was required for compliance with the mandates?
5. Inspections
6. Ongoing maintenance and risk management
7. Successes/lessons learned
8. Other issues

Columbia University's five campuses



Morningside/Manhattanville Campus – Non-healthcare facility

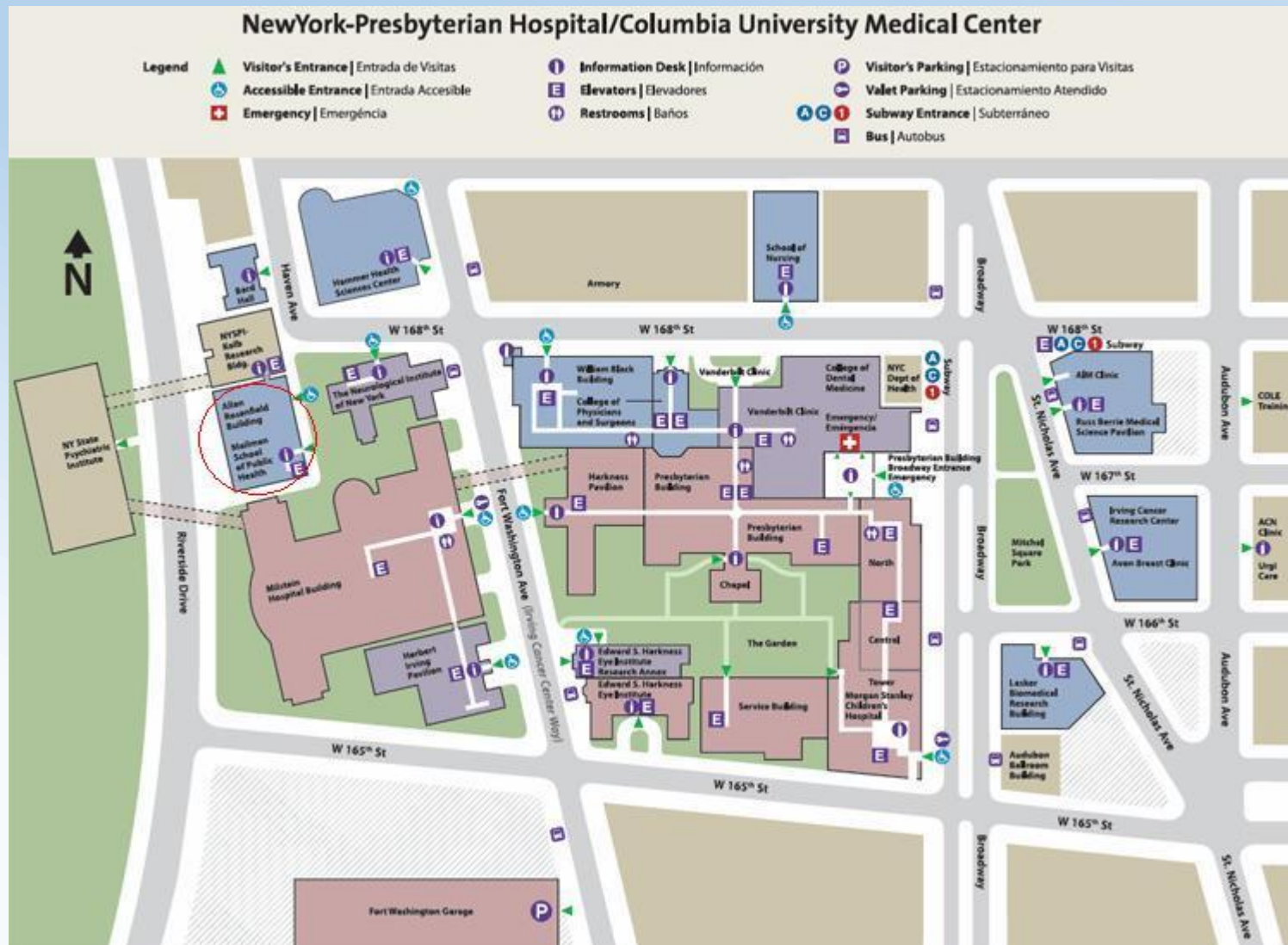
Medical Center Campus – Mixed Healthcare and Non-healthcare facility

Nevis Campus (Westchester County)

Lamont–Doherty Earth Observatory (Rockland county)

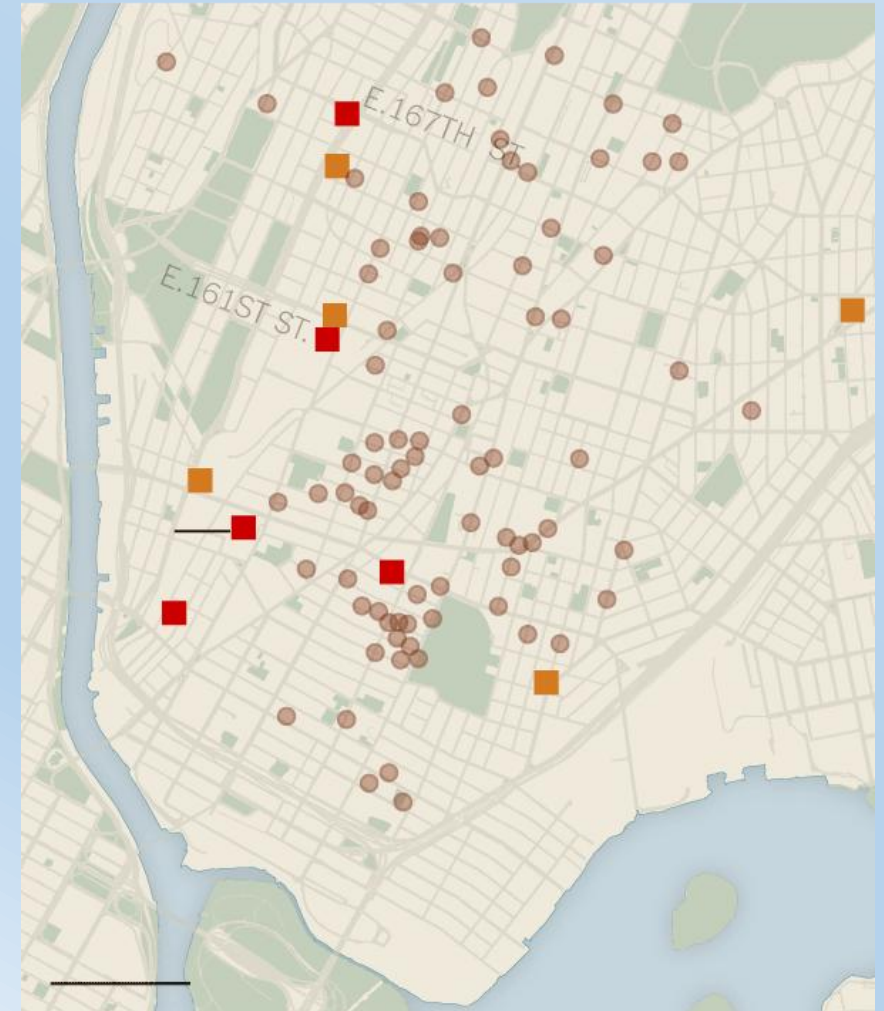


“Urban cooling tower” effect



Legionnaires' disease in the Bronx

- Possible sources of Legionnaires' outbreak
- Additional sites found with legionella bacteria
- Locations of people with Legionnaires



- New York City sees about 200 to 300 cases of Legionnaires' disease a year.
- 12 deaths in Bronx outbreak in August 2015

Topics

1. What is Legionella?
2. What makes Columbia special?
- 3. What was happening before the NYS/NYC mandates?**
4. What was required for compliance with the mandates?
5. Inspections
6. Ongoing maintenance and risk management
7. Successes/lessons learned
8. Other issues

How was Columbia University doing prior to the NYC and NYS mandates?

- Adherence to technical manuals/standards

1996



UNITED STATES
DEPARTMENT OF LABOR

Occupational Safety & Health Administration

For Workers ▾ For Employers ▾ Law & Regulations ▾ Data & Statistics ▾ Enforcement ▾ Training & Education ▾ News & Publications ▾ **En Español**

OSHA Technical Manual

General Information ▾ Health Hazards ▾ Safety Hazards ▾ Construction Hazards ▾

Section III: Chapter 7

Legionnaires' Disease

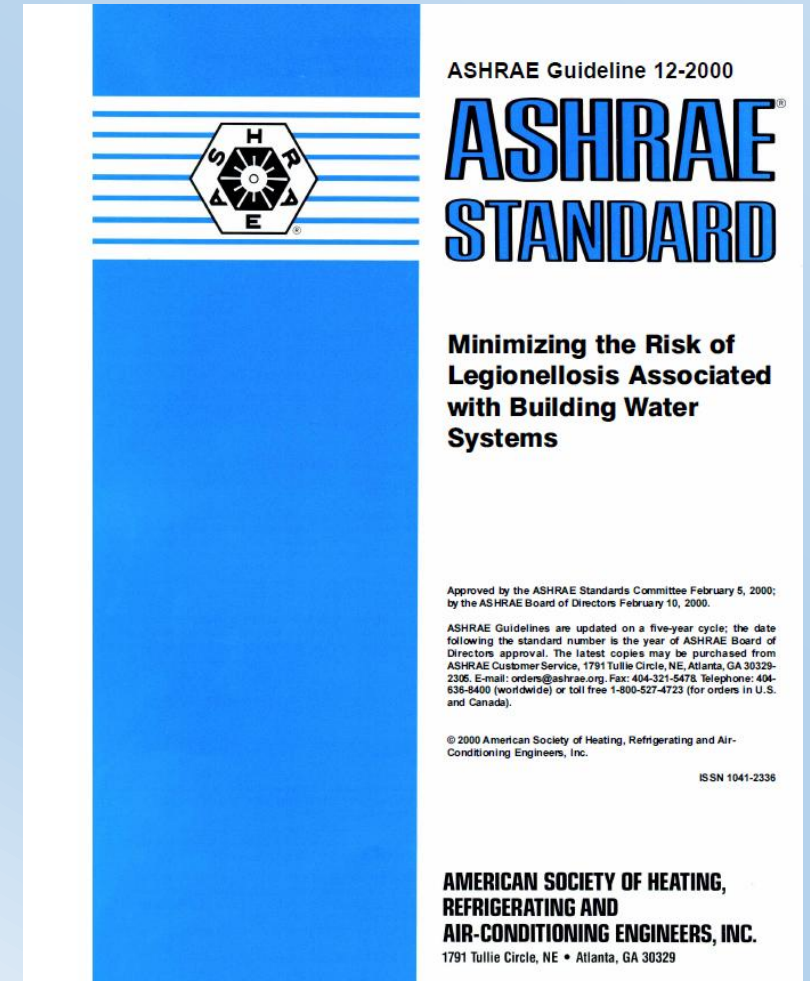
Table of Contents:

- I. [Introduction](#)
- II. [Disease Recognition](#)
- III. [Source Identification](#)
- IV. [Investigation Protocol](#)
- V. [Controls](#)
- VI. [Bibliography](#)

List of Appendices

- [Appendix III:7-1. Employee Awareness Program](#)
- [Appendix III:7-2. Physical Survey and Water Sampling Protocol](#)
- [Appendix III:7-3. Water Sampling Guidelines](#)
- [Appendix III:7-4. Legionnaires' Disease Case Identification](#)
- [Appendix III:7-5. Water Treatment Protocols for Facilities That Have Experienced a Legionnaires' Outbreak](#)

2000



ASHRAE Guideline 12-2000

ASHRAE[®]
STANDARD

**Minimizing the Risk of
Legionellosis Associated
with Building Water
Systems**

Approved by the ASHRAE Standards Committee February 5, 2000;
by the ASHRAE Board of Directors February 10, 2000.

ASHRAE Guidelines are updated on a five-year cycle; the date
following the standard number is the year of ASHRAE Board of
Directors approval. The latest copies may be purchased from
ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-
2306. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-
636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in U.S.
and Canada).

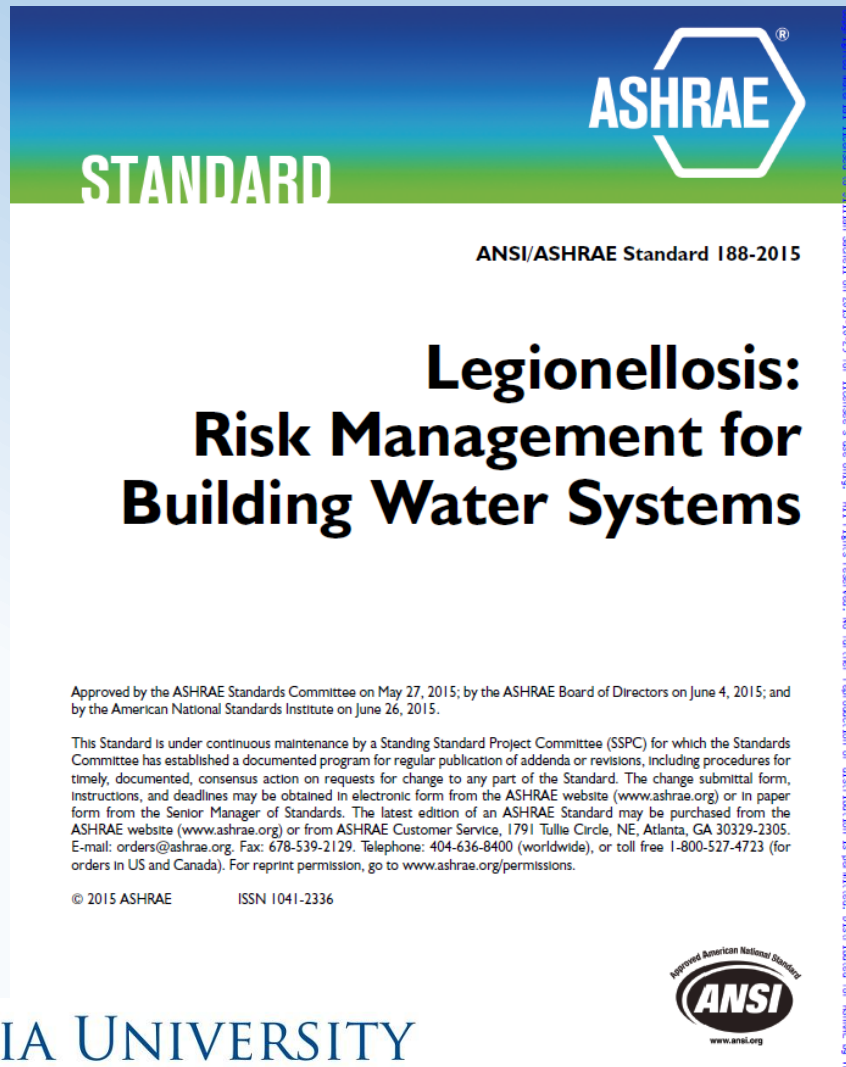
© 2000 American Society of Heating, Refrigerating and Air-
Conditioning Engineers, Inc.

ISSN 1041-2336

**AMERICAN SOCIETY OF HEATING,
REFRIGERATING AND
AIR-CONDITIONING ENGINEERS, INC.**
1791 Tullie Circle, NE • Atlanta, GA 30329

How was Columbia University doing prior to the NYC and NYS mandates?

2015



- A robust system for addressing internal complaints

The 2015 mandate...

NYS

Pursuant to the authority vested in the Public Health and Health Planning Council and the Commissioner of Health by section 225(5)(a) of the Public Health Law, Part 4 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York is added, to be effective upon filing with the Secretary, to read as follows:

4.1 Scope.

All owners of cooling towers, and all general hospitals and residential health care facilities as defined in Article 28 of the Public Health Law, shall comply with this Part.

4.2 Definitions.

As used in this Part, the following terms shall have the following meanings:

(a) Building. The term “building” means any structure used or intended for supporting or sheltering any use or occupancy. The term shall be construed as if followed by the phrase “structure, premises, lot or part thereof” unless otherwise indicated by the text.

(b) Commissioner. The term “commissioner” means the New York State Commissioner of Health.

(c) Cooling Tower. The term “cooling tower” means a cooling tower, evaporative condenser or fluid cooler that is part of a recirculated water system incorporated into a building’s cooling, industrial process, refrigeration or energy production system.

(d) Owner. The term “owner” means any person, agent, firm, partnership, corporation or other legal entity having a legal or equitable interest in, or control of the premises.

NYC

ARTICLE 317 COOLING TOWERS

§ 28-317.1 General. All owners of cooling towers shall comply with this article and the rules of the department.

§ 28-317.2 Definitions. As used in this article, the following terms shall have the following meanings:

COOLING TOWER. The term “cooling tower” means a cooling tower, evaporative condenser or fluid cooler that is part of a recirculated water system incorporated into a building’s cooling, industrial process, refrigeration, or energy production system.

§ 28-317.3 Registration. All owners of cooling towers shall register such towers with the department prior to initial operation in a form and manner as required by the commissioner and shall include, at a minimum, the following information:

1. Address of the building at which the cooling tower is located;
2. Intended use of cooling tower;
3. Name, address, telephone number and email address of owner;
4. Manufacturer of the cooling tower;
5. Model number of the cooling tower;
6. Specific unit serial number of the cooling tower;
7. Cooling capacity (tonnage) of the cooling tower;
8. Basin capacity of the cooling tower; and
9. Commissioning date of the cooling tower.

Topics

1. What is Legionella?
2. What makes Columbia special?
3. What was happening before the NYS/NYC mandates?
- 4. What was required for compliance with the mandates?**
5. Inspections
6. Ongoing maintenance and risk management
7. Successes/lessons learned
8. Other issues


What was required....

- Register, inspect and disinfect cooling towers immediately.
- Sample each cooling tower system for *Legionella* culturing within 30 days of August 17, 2015.
- Testing & Inspection – every 90 days (quarterly) cooling towers need to be inspected and sampled.
- Inspect, clean & disinfect cooling towers annually and certify.
- Cooling tower maintenance and risk management plan to ASHRAE standard 188 – March 1, 2016 deadline.

The registration.



NYS



Services News Government Local

COOLING TOWER REGISTRATION AND REPORTING

HOME HOW TO REGISTER REGULATIONS CONTACT

NYS COOLING TOWER LOGIN AND REGISTRATION

Create an Account
First Time Users

- OR -

Login

NYC



NYC Cooling Tower Registration Portal

By definition section 28-317.2 'Cooling Tower' means cooling tower, evaporating condenser and fluid coolers
Department of Health and Mental Hygiene Commissioner's Order

Email Address:

Password:

Forgot your password?
[Click here to reset it!](#)

Login

New Users: [Click here to register](#)

[Learn more about Cooling Towers](#)

Retired in place	Registration required	Letter with decommissioning statement
Drift eliminators	N/A	Required
Cleaning /disinfection	N/A	Twice a year by licensed individual
Aerobic bacteria testing	Quarterly	Weekly
Registration # issued	No	Yes

Scope of work

Morningside – Non-healthcare facility

- 5 academic/lab units

- 7 residential units

- 5 cooling towers retired in place

Medical Center Campus – Mixed Healthcare and Non-healthcare facility

- 14 academic/lab units

- 3 residential units

Nevis Campus (Westchester County)

- 2 academic/lab units

Lamont–Doherty Earth Observatory

- 1 academic/lab units



Reporting burden

Reported info included:

- Tower – building, manager, location, equipment details, inspection and maintenance
- Photos of tower



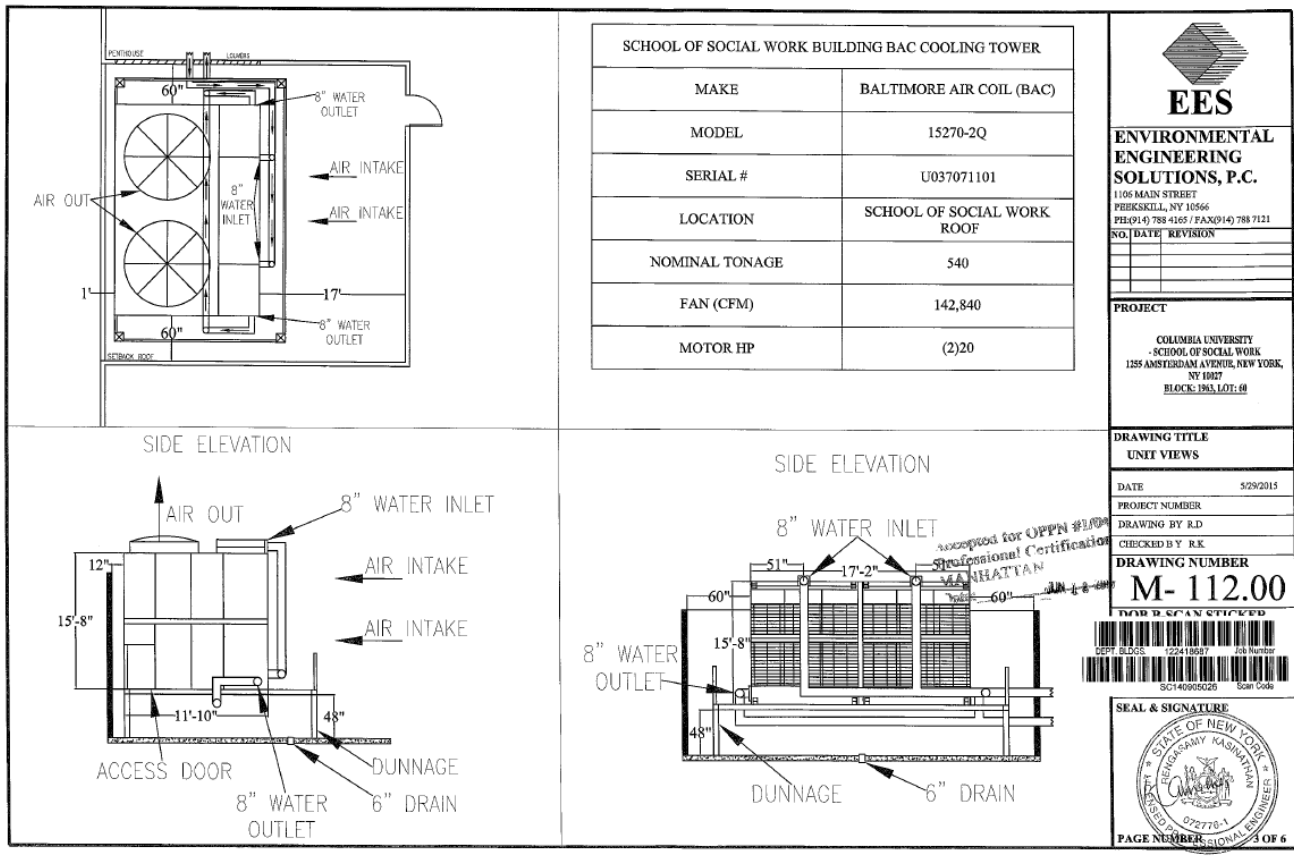
Registration	Alumni Hall (McVickar)
CU Building Name	
Status	
Registration No.	
Building	
*Building Type	
*Building Number	
*Street Name	
*City	
*Zip Code	
*County/Borough	
Property Manager/Primary Contact	
Business Name	
*First Name	
*Last Name	
*Primary Phone	
Mobile Phone	
*E-mail address	
Equipment Location	
*Building Number	
*Street Name	
*City	
*Zip Code	
*County/Borough	
Equipment Details	
*Equipment Type	
*Manufacturer/Trade Name	
*Model Number	
Specific Floor	
*Use of Equipment	
Certification Number for Listing	
*Serial Number	
*Capacity	
*Capacity Units	
Basin Capacity (Gals.)	
Type of Disinfection	
Location of maintenance program and plan [Free Field Text Box]	
Equipment Inspection and Maintenance	
Maintenance Performed By	

*Original Date Commissioned	
Last Annual Certification	
Annual Certification Date	
Last Inspection	
Finding, Deficiencies and Corrective Actions	
Next Inspection Due	
Last Routine Bacteriological Sample Collection Date	
Last Routine Bacteriological Sample Test Results	
Date Remediation Action Initiated (If Indicated)	
Last Legionella Sample Collection Date	
Last Legionella Sample Test Result	
Date Remediation Action Initiated (If Indicated)	
Date Last Emergency Disinfection and Cleaning	
Start Date of Last Shutdown	
Date Decommissioned	



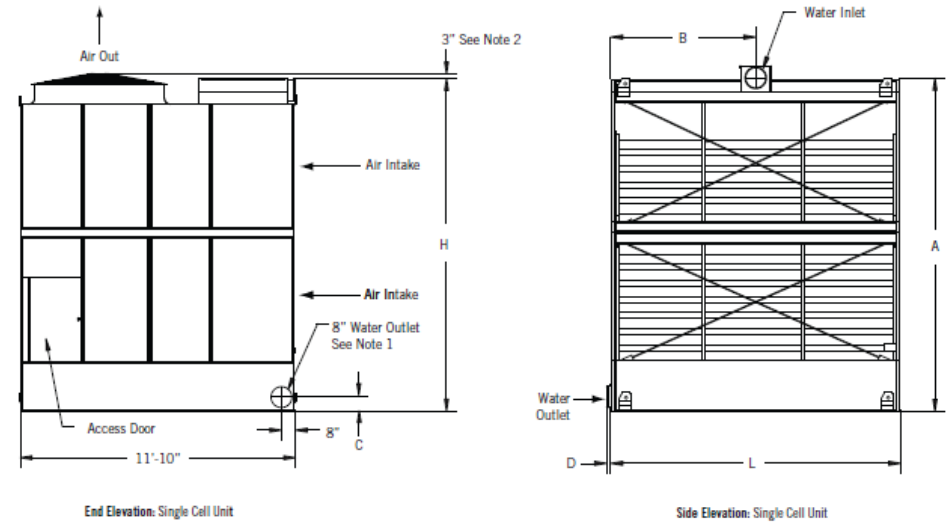
Reporting burden

Work involved estimated at 6 FTE weeks: Including NYC/NYS reporting, briefing management, and Emergency Management Operations Team



Series 1500 Engineering Data

NOTE: Do not use for construction. Refer to factory certified dimensions. This catalog includes data current at the time of publication, which should be reconfirmed at the time of purchase. Up-to-date engineering data, free product selection software, and more can be found at www.BaltimoreAircoil.com.



- NOTES:**
1. The specific size of the inlet and outlet connection may vary with the cooling water design flow rate. Consult unit print for dimensions.
 2. 9" for units with Whisper Quiet Fans.

Topics

1. What is Legionella?
2. What makes Columbia special?
3. What was happening before the NYS/NYC mandates?
4. What was required for compliance with the mandates?
- 5. Inspections**
6. Ongoing maintenance and risk management
7. Successes/lessons learned
8. Other issues

Inspection S



FDNY – Verification of tower location and existence



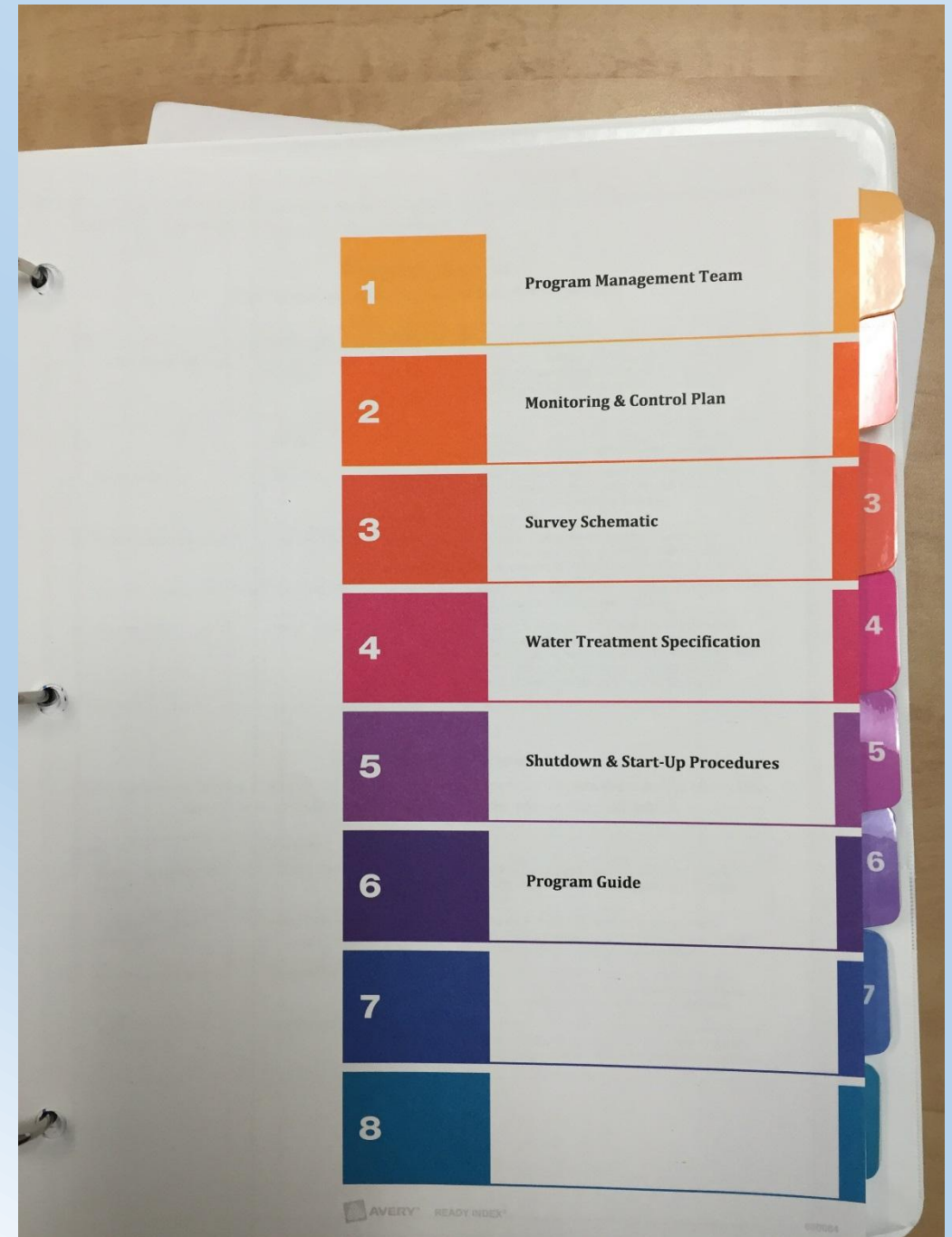
DOHMH – To be done

Records of water management contractors, Barclay and Nalco, were subpoenaed. They did not match records for Columbia (correct address) and needed to be reconciled

Topics

1. What is Legionella?
2. What makes Columbia special?
3. What was happening before the NYS/NYC mandates?
4. What was required for compliance with the mandates?
5. Inspections
- 6. Ongoing maintenance and risk management**
7. Successes/lessons learned
8. Other issues

Cooling tower maintenance and risk management plan



Cooling tower maintenance and risk management plan

FREQUENCY	MONITORING TASK	CONTROL MEASURE
Daily	Check water quality (pH, temperature, conductivity, oxidizing biocide residual as free chlorine)	Limit: See Water Treatment Specification Method: As recommended by water treatment program
Weekly	Water Treatment Equipment Verification	Limit: Scheduled Method: Visual inspection and findings by written or electronic checklist
Weekly	Aerobic bacteria test	Limit: <10,000 CFU/ml Method: Dip slide field test
Quarterly	Legionella culture test	Limit: <10 CFU/ml Method: Lab culture test
Quarterly	Inspection of cooling tower system	Limit: Scheduled Method: Visual inspection and findings by written or electronic checklist:
Semi-Annually	Off-Line Clean & Disinfect	Limit: Scheduled Method: Physical off-line cleaning & disinfection
As Needed	on-Line Disinfection	Limit: As needed Method: On-line disinfection

Topics

1. What is Legionella?
2. What makes Columbia special?
3. What was happening before the NYS/NYC mandates?
4. What was required for compliance with the mandates?
5. Inspections
6. Ongoing maintenance and risk management
- 7. Successes/lessons learned**
8. Other issues

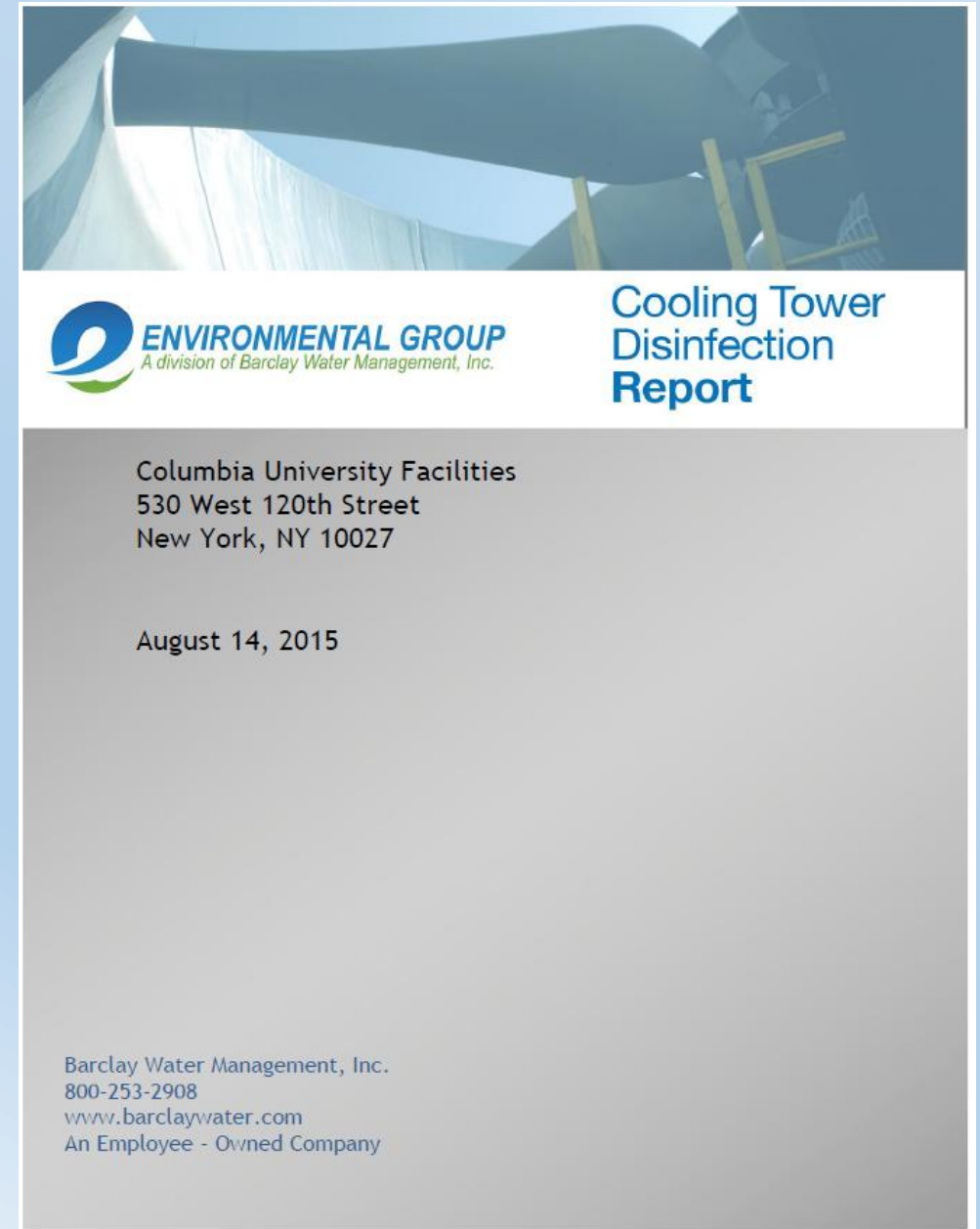
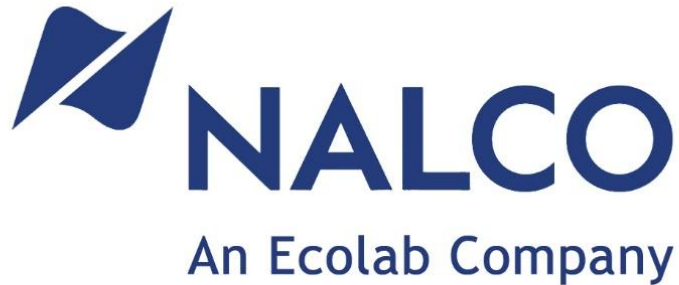
Successes/lessons learned

- Multiple stakeholder contributed. Stakeholders were able to quickly meet the needs of the city.
- Effective communication strategy to University community.
- The finest hour of the Facilities Compliance Teams.

The screenshot displays the 'PREPAREDNESS' section of the Columbia University website. At the top, there is a navigation bar with the university's name and links for 'Directory' and 'Help'. Below this, a 'More Services for Students, Faculty & Staff' link is visible. The main content area features a large blue banner for the 'University Travel Advisory on Zika Virus'. To the right of the banner, a red box contains the text: 'LEARN THE FACTS Before you travel, read the latest information on Zika virus.' Below the banner, there are links for 'Emergency Contacts', 'Tips', and 'Alerts and Announcements'. A sidebar on the left contains a list of links: 'Home', 'What is Preparedness?', 'Be Prepared', 'Policies and Procedures', and 'Frequently Asked Questions'. Below the sidebar is a search bar labeled 'Search Preparedness' with a 'GO' button. Further down, there is a sign-up form for email alerts and a text resize control. The main content area also features a green box titled 'Monitoring Legionnaires' Disease in the Bronx'. Below this, there is a detailed text update about an outbreak of Legionnaires' disease in the South Bronx, mentioning the NYC Department of Health and Mental Hygiene's investigation and the university's monitoring efforts. The text also mentions the issuance of an order to all owners of buildings with water-recirculating cooling towers across New York City to inspect and disinfect cooling towers. It further states that Columbia University's cooling towers are regularly monitored under an established precautionary maintenance program. A section titled 'About Legionnaires' Disease' follows, explaining that the disease is a type of pneumonia caused by Legionella bacteria, which grows in warm water and is not contagious. It notes that people only get sick by breathing in water vapor containing the bacteria, such as from faucets, showers, whirlpools, or cooling towers. The text also mentions that people who are sick with Legionnaires' cannot make others sick. Finally, it lists groups at high risk, including middle-aged or older people, especially cigarette smokers, people with chronic lung disease or weakened immune systems, and people who take immunosuppressive drugs. The text concludes by advising people to consult with their healthcare provider if they suspect Legionnaires' disease, particularly if they have a medical condition that affects their breathing, like emphysema, or if they are a smoker, and to ask their doctor about testing for Legionnaires' disease.

Successes/lessons learned

- Great relationship with water management contractors – Barclay and Nalco.
- Re-evaluated relationships with 3rd party vendors.



Topics

1. What is Legionella?
2. What makes Columbia special?
3. What was happening before the NYS/NYC mandates?
4. What was required for compliance with the mandates?
5. Inspections
6. Ongoing maintenance and risk management
7. Successes/lessons learned
- 8. Other issues**

Other issues

- Does testing for Legionella have any real utility?
- Is potable water a likely culprit?

Potable water management for Legionella

Healthcare facilities must test potable water

- Medical Center buildings interspersed with Hospital buildings (but no inpatient facilities)
- Mixed use buildings at Medical Center Campus – residential, dental faculty practice



Thanks! Questions?

