



NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Notice of Adoption of Chapter 8 (Cooling Towers) of Title 24 of the Rules of the City of New York

In compliance with § 1043(b) of the New York City Charter (the “Charter”) and pursuant to the authority granted to the Department by §§556 and 1043 of said Charter, a notice of intention to add a new Chapter 8 (Cooling Towers) to Title 24 of the Rules of the City of New York was published in the City Record on December 3, 2015 and a public hearing was held on January 4, 2016. Eight persons testified at the public hearing and 26 written comments were received, including several from persons who testified at the hearing. In response to the comments received, changes were made to the original proposal and are discussed below.

Statement of Basis and Purpose

Background

Legionellosis is an illness that must be reported to the Department in accordance with New York City Health Code §11.03 and State Sanitary Code (SSC) §2.1 (found in title 10 of NYCRR). The more serious form of legionellosis is a pneumonia known as Legionnaires’ disease (LD); a less serious form, Pontiac fever, is a flu-like illness. LD has a case fatality rate of 5-30%. The US Centers for Disease Control and Prevention (CDC) estimates that there are between 8,000 and 18,000 cases of LD in the United States annually, and that more than 10% of cases are fatal.¹

People are exposed to *Legionella* bacteria through the inhalation or aspiration of aerosolized water (droplets or mist) that contain the bacteria. Person-to-person transmission of *Legionella* has not been demonstrated. Susceptible people at higher risk for LD include the elderly, people who are immune compromised or have other medical conditions, and heavy smokers. In New York City, there were 301 cases of LD in 2013 and 225 cases in 2014. Between 2000 and 2014 there were, on average, 165 confirmed cases a year with the number of annual cases ranging from 44 to 301. Preliminary data indicate there were 438 confirmed cases of LD diagnosed in New York City residents in 2015. In July and August 2015, the Department investigated an unusually large cluster of 133 cases of LD that occurred in the Bronx and resulted in 16 deaths.² The Department determined that this outbreak was associated with aerosolized *Legionella* bacteria emanating from one or more building cooling towers to which susceptible persons were exposed. Responding to the outbreak, the City Council and Mayor enacted Local Law 77 of 2015. At the same time, the State Public Health and Health Planning Council (PHHPC) adopted a new Part 4 of the SSC on an emergency basis, citing other instances of LD outbreaks and fatalities occurring in other parts of the State that are believed to be associated with cooling towers.³

Both Local Law 77 and the SSC §4.2(c) define a cooling tower as “a cooling tower, evaporative condenser or fluid cooler that is part of a recirculated water system incorporated into a building’s cooling,

¹ <http://www.cdc.gov/legionella/fastfacts.html>

<http://www.cdc.gov/legionella/index.html>

<http://www.cdc.gov/legionella/about/treatment-complications.html>

² <http://www.nyc.gov/html/doh/html/diseases/cdlegi.shtml>

³ The State’s emergency rules originally were scheduled to expire November 18, 2015 but have been reissued, and permanent rules are expected.

industrial process, refrigeration or energy production system.” As the PHHPC’s Emergency Justification for Part 4 of the State Sanitary Code, effective March 2, 2016, states:

Because water is part of the process of removing heat from a building, these devices require biocides—chemicals that kill or inhibit bacteria (including *Legionella*)—as means of controlling bacterial overgrowth. Overgrowth may result in the normal mists ejected from the tower having droplets containing *Legionella*.

Local Law 77 added a new Article 317 to Title 28 of the Administrative Code that required owners of cooling towers to register them with the Department of Buildings (“DOB”) by September 17, 2015. Towers must be inspected, tested, cleaned and disinfected in accordance with new Administrative Code §17-194.1 and rules adopted by the Department. Owners and operators of cooling towers must annually certify to DOB that their cooling towers have been inspected, tested, cleaned and disinfected and that a maintenance program and plan has been developed and implemented in accordance with Administrative Code §17-194.1. Statewide, including in New York City, owners of all cooling towers must also comply with SSC Part 4, which includes registration with and reporting to the State Department of Health.

This new Chapter of the Department’s Rules sets forth specific requirements for the operation and maintenance of cooling towers in New York City that comply with and further those in Part 4 of the SSC. The Chapter’s provisions that are equivalent to the SSC are noted below. This Chapter is organized somewhat differently than SSC Part 4; more terms are defined in this Chapter and more detailed instructions for management and maintenance are provided than those contained in SSC Part 4 to facilitate compliance with both the City and State rules and requirements.

Chapter 8 contents and further changes

The new Chapter 8 includes the provisions outlined below. The description also notes changes made to the original published proposal in response to comments received.

§8-01 Scope and applicability: applicable to all owners and operators of buildings and other premises that are equipped with cooling towers.

§8-02 Definitions: to facilitate compliance with and enforcement of these rules, more terms are defined in this Chapter than in the corresponding sections of either the Administrative Code or SSC Part 4. Since the proposed rule was published for public comment, a definition has been added for “biocidal indicator,” and the definition of “water quality parameters” has been amended to delete “total dissolved solids (TDS)” and “oxidation reduction potential (ORP)” as parameters and add “biocidal indicator” as an additional parameter. The term “responsible person” has also been redefined as someone who is working under the guidance of a “qualified person.” This change was made to clarify that the “qualified person” is not required to be the direct supervisor of the “responsible person.”

§8-03 Maintenance program and plan: the requirements of this section exceed those of SSC Part 4, including specific routine maintenance tasks; identification of persons responsible for various functions; identifying system components; and establishing a system risk management assessment to identify areas that may create problems and lead to proliferation of *Legionella* bacteria. In response to comments that the records of cooling tower operations and the maintenance program and plan may not be kept at the cooling tower itself, the Department has modified this requirement to allow the plan to be kept in an adjacent location on the same campus, complex or lot where the cooling tower is located. Section 8-07(a) has also been amended to be consistent with this change.

§8-04 Process control measures: this section establishes requirements for routine monitoring, to be conducted at least weekly by the “responsible person,” and for compliance inspections to be conducted at least every 90 days by a qualified person. It specifies standards for maintenance, cleaning, and parts replacement; and requires installation of high efficiency drift eliminators in all new and retrofitted cooling tower systems and in existing ones, where practicable. In response to comments received since the proposed rule was published, subdivision (a)(3) has been changed to require observations of wetted surfaces only if this can be done without shutting down the cooling tower system. Subdivision (c)(2) has been amended to require that alterations to equipment be made in compliance with the current City Construction Codes and that cleaning protocols and safety equipment be included in the management program and plan.

§8-05 Water treatment: this section specifies requirements for automatic treatments, use of chemicals and biocides and monitoring water quality characteristics/parameters, and establishes a schedule for sampling for *Legionella* and other bacteria including requiring additional sampling when certain events occur. This section also mandates the use of certain qualified laboratories for analysis and requires reporting levels of *Legionella* at a certain magnitude to the Department within 24 hours of obtaining test results; and specifies corrective actions for various levels of bacteria. Although the 2014 New York City Plumbing Code Appendix C authorizes use of rainwater or recycled water as makeup water for cooling towers, it does not require disinfection for *Legionella* bacteria before use. These rules prohibit such use unless owners use additional control measures approved by the Department that protect against cooling tower system contamination since the Department believes that this water may not meet public health standards and may tend to support microbial growth. In response to comments received since the proposed rule was published, provisions in subdivision (c) on biocide applications and recordkeeping have been clarified, and a new requirement added that any water treatment system that does not use any oxidizing biocide must be approved by the Department. Subdivision (d) has been amended to restrict (as opposed to completely prohibit) the use of non-chemical water treatment to systems where effective chemical treatment is also in place to control *Legionella*. In subdivision (f), provisions have been added to clarify that continuous automated monitoring is allowed in lieu of manual monitoring. The initially published Table 1 of corrective actions has been split into two tables: Table 8-1 indicates required actions when water samples are culture positive for *Legionella* and Table 8-2 indicates the required actions for heterotrophic and dip slide results for uncultured bacteria.

§8-06 System shutdown and start-up; commissioning new cooling towers: this section sets forth requirements for pre-seasonal cleaning and disinfection and for new cooling towers being placed into use. In response to comments received since the proposed rule was published, subdivision (c) has been amended to require pre-startup inspection and *Legionella* sampling.

§8-07 Records: this requires the maintenance of records of all activities and that such records be made available for immediate inspection by the Department at the premises where the cooling tower is installed.

§8-08 Modification: authorizes the Commissioner to modify the application of a provision of these rules where compliance imposes an undue hardship and would not otherwise be required by law, provided that the modification does not compromise public health concerns.

§8-09 Penalties: establishes a schedule of penalties for initial and subsequent violations within the limits set forth in Administrative Code §17-194.1.

Statutory Authority

This amendment to Title 24 of the Rules of the City of New York (“RCNY”) is promulgated pursuant to Local Law 77 of 2015, and sections 556 and 1043 of the New York City Charter (“the Charter”). Section

556 of the Charter broadly authorizes the Department of Health and Mental Hygiene (“the Department”) to regulate all matters pertaining to the health of the City. Section 1043 grants the Department rule-making authority. Local Law 77 of 2015, enacted August 18, 2015, added a new §17-194.1 to the New York City Administrative Code (“Administrative Code”) requiring owners of buildings to clean and disinfect cooling towers and authorizing the Department to adopt rules to implement these requirements. Many of Local Law 77’s substantive provisions for inspection and disinfection become effective upon the promulgation of these Department rules.

The rule is as follows:

Underlined matter is new.

“Shall” and “must” denote mandatory requirements and may be used interchangeably in the rules of this Department, unless otherwise specified or unless the context clearly indicates otherwise.

Section 1. Title 24 of the Rules of the City of New York is amended by adding a new Chapter 8 (Cooling Towers) to read as follows:

CHAPTER 8

COOLING TOWERS

§8-01 Scope and applicability.

§8-02 Definitions.

§8-03 Maintenance program and plan.

§8-04 Process control measures.

§8-05 Water treatment.

§8-06 System shutdown and start-up; commissioning and decommissioning cooling towers.

§8-07 Records.

§8-08 Modification.

§8-09 Penalties.

§8-01 Scope and applicability. This Chapter applies to owners of New York City buildings or other premises in the City that are equipped with a cooling tower system.

§8-02 Definitions. When used in this Chapter, the following terms mean:

“ANSI/ASHRAE 188-2015” means sections 5, 6 and 7.2 of *ANSI/ASHRAE Standard 188-2015*

Legionellosis: Risk Management for Building Water Systems, a publication issued by the American National Standards Institute (ANSI)/American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), final approval date June 26, 2015, at pages 4-8.

“Bacteriological indicator” means a biological process control indicator that estimates microbial content in the circulating water of a cooling tower system, such as heterotrophic plate count (HPC) as measured in a water sample or by a dip slide.

“Biocidal indicator” means a direct or indirect measure of the effectiveness of biocide, consisting of free halogen residual concentration or oxidation reduction potential (ORP), as specified in the management program and plan.

“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.

“Cleaning” means physical, mechanical or other removal of biofilm, scale, debris, rust, other corrosion products, sludge, algae and other potential sources of contamination.

“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.

“Cooling tower system” means one or more cooling towers and all of the recirculating water system components, process instruments and appurtenances through which water flows or comes into contact with key parts consisting of biocide, anti-scaling and anti-corrosion chemical applicators, valves, pumps, the tower superstructure, condensers and heat exchangers and other related components. The cooling tower system may comprise multiple cooling towers that share some or all superstructure components.

“Corrective actions” mean disinfection, cleaning, flushing, and other activities to remedy biofilm growth, *Legionella* proliferation, or other system mechanical problems identified through monitoring, inspections, or other means as may be determined by the Department.

“Compliance inspection” means the inspection, testing and other activities that are required on a regular basis (at least every 90 days) in accordance with the maintenance program and plan and this Chapter, including the completion of a written or electronic checklist, and must be conducted and certified by a qualified person.

“Dead legs” mean lengths of pipe normally closed at one end or ending in a fitting within the cooling tower system that limits water circulation and is likely to result in stagnant water in the system.

“Department” means the New York City Department of Health and Mental Hygiene.

“Dip slide” means a method to test for microorganisms (such as HPC) consisting of a sterile culture medium affixed to a sterile slide, that is dipped directly into the liquid that is to be sampled.

“Disinfection” means using one or more of the biocides registered with the New York State Department of Environmental Conservation at a defined concentration, under specific conditions and for an established period that will kill or inactivate pathogenic microorganisms.

“Drift eliminator” means a system of baffles or cells that cause separation of entrained water designed to remove aerosols from cooling tower exhaust.

“Heterotrophic plate count” or “HPC” means a measure of the concentration of microorganisms that require an external source of organic carbon for growth including bacteria, yeasts and mold in water samples.

“Idling” means turning off or limiting water circulation within the cooling tower system but not draining the system water.

“Immediate” or “immediately” means within 24 hours when used in regards to (i) actions required to be taken under this Chapter, or (ii) incidents or results required to be reported under this Chapter, or (iii) records required to be made available to the Department under this Chapter.

“Legionella” means the genus of bacteria which is ubiquitous in aqueous environments, including the recirculated water of cooling tower systems that are not properly or regularly maintained. There are more than 50 different species of *Legionella*, all of which are potentially pathogenic.

“Legionella sample” means water or other sample to be examined for the presence of viable *Legionella* bacteria using semiselective culture media and procedures specific to the cultivation and detection of *Legionella* species, such as those outlined in International Organization for Standardization (ISO) Standards 11731-1:1998 and 11731-2:2004.

“Maintenance program and plan” or “plan” means a written set of measures describing monitoring, cleaning, disinfection and all other activities for the prevention and control of *Legionella* growth in a cooling tower system, that is in accordance with section 5, 6 and 7.2 of ANSI/ASHRAE 188-2015 and with the manufacturer’s instructions, and is developed by a qualified person.

“Makeup water” means water added to the cooling tower system on a regular basis to replace water lost by evaporation, drift or leakage and to maintain optimal system operation and process control.

“Management and maintenance team” means the individual or individuals designated by a building owner to be responsible for the continued effective and safe operation of a cooling tower system.

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

“Process control measures” mean actions that must be taken to evaluate internal functioning of the cooling tower system, including monitoring conductivity, pH, biological indicators and other parameters, and observing phenomenon such as scaling, corrosion and biofilm.

“Qualified person” means a New York State licensed and registered professional engineer; a certified industrial hygienist; a certified water technologist with training and experience developing management plans and performing inspections in accordance with current standard industry protocols including, but

not limited to ANSI/ASHRAE 188-2015; or an environmental consultant who has at least two (2) years of operational experience in water management planning and operation.

“Responsible person” means a person employed or whose services are retained by an owner, who understands and is capable of performing the required daily water quality measurements, weekly system monitoring and operation and maintenance of a cooling tower system in accordance with the maintenance program and plan, and making recommendations for diagnosing anomalous conditions that require corrective actions, under the guidance of a qualified person. The responsible person should be capable of measuring water pH, temperature and disinfectant residual levels at proper locations/frequencies; checking biocide storage container levels; recording dates, amounts and times of biocide injection; and logging all other relevant data and comments.

“Risk management assessment” means a process for comprehensively identifying, describing and evaluating in detail all aspects of a cooling tower system that may potentially contribute to the growth and dissemination of *Legionella* bacteria.

“Routine monitoring” means evaluation and other activities that must be completed periodically in accordance with the maintenance program and plan and this Chapter.

“Stagnant water” means water that is confined, standing, experiencing a period of low flow or usage, and not being actively circulated through the cooling tower system.

“Standard methods” means accepted protocols for sampling, recording, laboratory testing, reporting and other procedures related to environmental and water quality sampling, including, but not limited to, those set forth in *Standard Methods for the Examination of Water and Wastewater* 22nd Edition, 2012, a publication issued jointly by the American Public Health Association, the American Water Works Association and the Water Environment Federation and the *Standards Microbiological Methods* (TC 147/SC4) published by the International Organization for Standardization, or successor editions.

“System shutdown” means shutting off or closing and draining the cooling tower system when cooling is no longer needed.

“System start-up” means commissioning a new system, or putting the cooling tower system into operation after system shutdown or idling.

“Water quality parameters” means temperature, pH, conductivity, biocidal indicator, bacteriological indicator and other chemical and physical indicators of system process control.

§8-03 Maintenance program and plan. For each cooling tower system the owner must have a maintenance program and plan prepared by a qualified person in accordance with sections 5, 6 and 7.2 of ANSI/ASHRAE 188-2015, the manufacturer’s instructions, and the requirements of this Chapter. The plan must be kept current and amended by a responsible or qualified person as needed to reflect any changes in

the management and maintenance team, system design, operation or system control requirements for the cooling tower system. The plan must be kept in the building where a cooling tower or cooling tower system is located, or in an adjacent building or structure on the same campus, complex, lot, mall or on-site central engineering division, and must be made available to the Department for inspection upon and at the time of a request. At a minimum, the plan must include and describe:

(a) *Management and maintenance team.* Identification, including names and contact information (mail and email addresses and telephone numbers) and description of the function of each person on the cooling tower system management and maintenance team, including:

(1) The owner of the building where each cooling tower system is located and any manager or other person designated by the owner as responsible for compliance with the requirements of Administrative Code §17-194.1 and this Chapter.

(2) Any person designated by the owner as a responsible person, as defined in §8-02 of this Chapter.

(3) Every consultant, service company and qualified person who cleans, disinfects, delivers chemicals or services the cooling tower system.

(b) *Cooling tower system.* Identification, specifications and description of each cooling tower system and all components located at a specific address, including:

(1) The number of cooling towers in the cooling tower system.

(2) The location of each cooling tower in relation to the building and the building address, block and lot number.

(3) The dimensions and characteristics of the cooling tower system including total recirculating water volume, cooling tower tonnage, biocide delivery method, flow rate and other key characteristics.

(4) The purpose of the cooling tower system and seasonal or year-round operation including start and end date, if applicable. For systems with multiple cooling towers, conditional operation, such as cycling or scaling related to cooling demand, must also be noted.

(5) The New York City Department of Buildings registration number for each cooling tower.

(6) The cooling tower manufacturer, model number and serial number, if applicable.

(7) A flow diagram or schematic of the cooling tower system, identifying all of the principal components and appurtenances of the cooling tower system including makeup water and waste stream plumbing locations.

(c) *Risk management assessment.* The assessment must identify risk factors for *Legionella* proliferation and specify risk management procedures for all or parts of each cooling tower system, and anticipated conditions including:

(1) Any dead legs or stagnant water in the recirculation system.

(2) Operating configurations and conditions that may occur after periods of extended inactivity lasting more than three (3) days, including idling or low circulation while not being fully drained.

(3) System parts that require continual operation throughout the year making regular, periodic offline cleaning and disinfection difficult.

(4) Any components that may add additional risk factors for organic material buildup and microbial growth such as strainers and out-of-use filters.

(5) Sources of elevated organic contamination, including, but not limited to windblown debris, bird waste and plant material.

(6) Design configurations that present risk of direct sun exposure on basin, deck or fill.

(7) Ventilation intakes or other routes for human exposure to cooling tower aerosols.

(8) System components adversely affecting water quality management procedures.

(9) Other risk or limiting factors or constraints in the cooling tower system's design and functioning.

(d) Cooling tower operation

(1) Control measures, corrective actions, documentation, including a written checklist for routine monitoring, and reporting that comply with sections 8-04 through 8-08 of this Chapter and any routine maintenance activities recommended by the manufacturer's instructions, including performance measures, which may sufficiently demonstrate adequate implementation of the operation requirements described in the maintenance program and plan. Where there is a conflict between the requirements of this Chapter, Part 4 of the State Sanitary Code, section 17-194.1 of the Administrative Code, and the manufacturer's instructions, the maintenance program and plan must reflect the most stringent requirement.

(2) Specific, detailed seasonal and temporary shutdown and start-up procedures.

(3) Notification and communication strategies among management and maintenance team members regarding the required corrective actions in response to process control activities, monitoring, sampling results and other actions taken to maintain the cooling tower system.

§8-04 Process control measures.

(a) Routine system monitoring. An owner must designate a responsible person as defined in §8-02 of this Chapter to monitor each cooling tower system at least weekly while such system is in use.

(1) The responsible person must enter on a written or electronic checklist provided and maintained by the owner all visual observations of the cooling tower system and associated equipment.

(2) The responsible person must possess the skills and have the knowledge necessary to be able to monitor the system under the guidance of a qualified person, in accordance with the management program and plan.

(3) All wetted surfaces visible during cooling tower operation without shutting down the system, tower basins and drift eliminators must be observed during monitoring and the presence of organic material, biofilm, algae, scale, sediment and silt/dust deposits, organics (oil and grease), and other visible contaminants observed must be noted on the checklist.

(4) The responsible person must observe and note the condition of chemical dosing and control equipment and the bleed-off system, and determine if there is sufficient storage and delivery of treatment chemicals.

(5) Any system anomalies or problems must be recorded on the checklist and reported to the management and maintenance team for immediate corrective action.

(b) Compliance inspections. An owner must retain a qualified person to conduct a compliance inspection at least once every ninety (90) days while a cooling tower system is in operation. The qualified person must complete and the owner must maintain a written or electronic checklist containing observations and findings with respect to any of the following:

(1) Presence of organic material, biofilm, algae, and other visible contaminants.

(2) General condition of the tower, the basin, packing material and drift eliminator.

(3) Quality of water makeup connections and control.

(4) Proper functioning of the conductivity control.

(5) Proper functioning of all dosing equipment (pumps, strain gauges).

(6) Review of routine maintenance records to ensure proper implementation of required activities and corrective actions as needed.

(c) Maintenance.

(1) Routine maintenance. Cooling tower systems must be maintained and operated in accordance with the maintenance program and plan. Routine maintenance must address all components and operations, including, but not limited to, general system cleanliness, drift eliminator and fill material condition, overall distribution operation, water treatment system, basin/remote sump cleaning, and purging of stagnant and low-flow zones.

(2) Replacement in kind. Any replacement part or equipment used in a cooling tower must comply with the manufacturer's design and performance specifications. As applicable, replacement materials must be corrosion resistant and effectively prevent the penetration of sunlight. Any alteration or replacement of a cooling tower system must comply with the New York City Construction Codes

(d) Cleaning. The cooling tower system must be cleaned whenever routine monitoring indicates a need for cleaning, but no less than twice a year, in accordance with the maintenance program and plan. Cleaning protocol indicated by the manufacturer's instructions or industry standards, and worker protective measures, as required by applicable law must be specified in the maintenance program and

plan. Water contact areas such as the basin, sump, fill, spray nozzles and fittings, drift eliminators and air intake louvres must be properly accessed or removed to facilitate cleaning.

(e) *Aerosol and mist control.* The cooling tower system must be operated at all times to minimize the formation and release of aerosols and mist. Owners must install and maintain drift eliminators in accordance with the manufacturer's specifications and the New York City Construction Codes. The calculated drift loss at maximum design water circulation must not exceed the manufacturer's tested value for maximum drift loss. Counter-flow cooling towers must achieve a reduction of drift loss to no more than 0.002% percent of the recirculated water volume; cross-flow cooling towers must achieve a reduction of drift loss to no more than 0.005% of the recirculated water volume.

§8-05 **Water treatment.** Prior to changing an existing chemical treatment system or introducing a new chemical treatment agent, cooling tower design, installation, operation, and maintenance must be evaluated by a qualified person to ensure compatibility between the chemicals and the cooling tower system's materials, and to minimize microbial growth and the release of aerosols. The evaluation must describe the optimum level of chemicals to achieve the desired result in a manner which can be used as a system performance measure.

(a) *Daily automatic treatment while in operation.* Water in a cooling tower system must be treated at least once a day when the system is in operation and such treatment must be automated, unless the maintenance program and plan explicitly states how manual or less frequent biocide additions will provide effective control of *Legionella* growth.

(b) *Recirculating system.* A cooling tower system must be operated and programmed to continually recirculate the water irrespective of the building's cooling demand of the system, unless the maintenance program and plan specifies in detail how the intended water treatment schedule will be carried out, and how effective biofilm and microorganism control will be achieved when the whole or a part of the system is idle during the scheduled chemical injection.

(c) *Chemicals and biocides.* Chemicals and biocides must be used in quantities and combinations sufficient to control the presence of *Legionella*, minimize biofilms, and prevent scaling and corrosion that may facilitate microbial growth. Only New York State Department of Environmental Conservation approved oxidizing chemicals may be used as the primary biocide control. For systems where oxidizing chemicals cannot be used as the primary biocide to control the presence of *Legionella* building owners must submit an alternative plan for effective bacteriological control for approval by the Department.

(1) *Biocide applications.* Any person who performs cleaning and disinfection or applies biocides in a cooling tower system must be a commercial pesticide applicator or a pesticide technician certified in

accordance with the requirements of Article 33 of the New York State Environmental Conservation Law and 6 NYCRR Part 325, or a pesticide apprentice under the supervision of a certified applicator.

(2) Registered biocides. Only biocide products registered with the New York State Department of Environmental Conservation may be used to meet the disinfection requirements of this Chapter.

(3) Records. Water treatment records must be kept for all chemicals and biocides added, noting the purpose of their use, the manufacturer's name, the brand name, the safety data sheet, the date and time of each addition, and the amount added each week.

(4) Chemical and biocide additions. Chemicals and biocides must be added in accordance with this section and the procedures described in the maintenance program and plan addressing, as applicable, feeding mechanism, feeding location, frequency, set timer, duration, triggering events, control procedures, and target biocide residuals. Water treatment chemicals and biocides must be used in accordance with the product label and manufacturer's instructions.

(d) Non-chemical water treatment devices restricted. Only biocide products registered with the New York State Department of Environmental Conservation may be used to meet the disinfection requirements of this Chapter. Non-chemical water treatment devices that employ alternative technologies to control biological growth may not be used in lieu of chemical biocide unless approved by the Department. Non-chemical water treatment devices may be installed as part of a cooling tower system as specified in the management program and plan, provided that the required chemical water treatment also being used adequately controls for *Legionella*.

(e) Makeup water. Owners using water derived from rainwater capture or recycling water systems as a source of cooling tower system makeup water must install a drift eliminator and test and treat water in accordance with a specific alternative source water plan. This plan is in addition to the maintenance program and plan required by §8-03 of this Chapter, and must be approved by the Department. The alternative water source plan must include provisions for adequate design of the treatment and control components and on-going evaluation to eliminate any risk to public health.

(f) Water quality monitoring.

(1) Frequency. Water quality parameters, including but not limited to pH, temperature, conductivity and biocidal indicators, must be measured and recorded as specified in the management program and plan as follows:

(A) Manual measurements. At least three times each week, provided that no more than two days pass without such measurement when the cooling tower system is operating.

(B) Continuous, automated and/or remote measurements. When continuous, automated and/or remote measurements and recordings are used, the management program and plan must show how effective measurements of system process control are being monitored. Automated measurements must be

properly recorded and results made immediately available to responsible and qualified persons and to Department inspectors when requested.

(2) Minimum weekly biological process control indicators. A bacteriological indicator to estimate microbial content of recirculating water must be collected and interpreted in accordance with Table 8-2 at least once each week while the cooling tower system is operating. Indicators must be taken at times and from water sampling points, as detailed in the maintenance program and plan, that will be representative of water microbial content. Indicators may be taken at any time from constant chemical treatment systems. Indicators from systems that use intermittent biocide applications must be taken before biocide application and reflect normal cooling tower operating conditions.

(3) Legionella samples. Legionella culture testing must be conducted no less frequently than every 90 days during cooling tower system operation. A Legionella sample must be analyzed by a US Centers for Disease Control and Prevention ELITE Program certified laboratory, by the New York State Department of Health Wadsworth Center or other laboratory approved by the Department. Test results of all Legionella species at or above the magnitude of level 4 as indicated in Table 8-1 must be reported to the Department within 24 hours of receiving the test results. Additional emergency Legionella sampling must be conducted if any of the following occur:

(A) Power failure of sufficient duration to allow for growth of bacteria;

(B) Loss of biocide treatment sufficient to allow for growth of bacteria;

(C) Failure of conductivity controls to maintain proper cycles of concentration;

(D) At the request of the Department upon a determination that one or more cases of legionellosis is or may be associated with the cooling tower, based on epidemiological data or laboratory testing.

(E) Any time two consecutive bacteriological indicator sample results are above Level 4 as indicated in Table 8-2; or

(F) Any other conditions specified by the Department.

(4) Monitoring and sampling locations. System monitoring and sampling locations must be representative of the entire cooling tower system. The system must be operating with water circulating in the system for at least one hour prior to water quality measurements or collection of samples.

(5) Water quality corrective actions. The maintenance program and plan must identify the procedures, responsible parties, required response time(s) and notification protocol for corrective actions and must include, at a minimum, corrective actions that must be implemented according to the result levels in Table 8-1 and Table 8-2.

Table 8-1. Corrective actions required for *Legionella* culture results.

<u>Level</u>	<u><i>Legionella</i> Culture Result¹</u>	<u>Process Triggered by <i>Legionella</i> Culture Results</u>
<u>1</u>	<u><10 CFU/ml</u>	<u>Maintain water chemistry and biocide levels.</u>
<u>2</u>	<u>≥ 10 CFU/ml to <100 CFU/ml</u>	<u>Initiate immediate disinfection by increasing biocide concentration or using a different biocide within 24 hours; review treatment program; and retest water within 3-7 days. Subsequent test results must be interpreted in accordance with this Table until level 1 is reached.</u>
<u>3</u>	<u>≥ 100 CFU/ml to <1000 CFU/ml</u>	<u>Initiate immediate disinfection by increasing biocide concentration or using a different biocide (within 24 hours), reviewing treatment program, performing visual inspection to evaluate need to perform cleaning and further disinfection. Retest water within 3-7 days. Subsequent test results must be interpreted in accordance with this Table until level 1 is reached.</u>
<u>4</u>	<u>≥ 1000 CFU/ml</u>	<u>Initiate immediate disinfection by increasing biocides within 24 hours. Within 48 hours perform full remediation of the tower by hyperhalogenating², draining, cleaning, and flushing. Review treatment program, retest water within 3-7 days. Subsequent test results must be interpreted in accordance with this Table until level 1 is reached. For <i>Legionella</i> results at this level, notify Department within 24 hours of receiving test result.³</u>

1. Performed by a CDC ELITE Laboratory, or NYSDOH Wadsworth Laboratory, or another laboratory approved by the Department. Combine all species of *Legionella* detected.
2. At a minimum, dose the cooling water system with 5 to 10 ppm Free Halogen Residual for at least 1 hour; pH 7.0 to 7.6.
3. In a manner as specified on the Department's website.

Table 8-2. Corrective actions required for bacteriological indicator results.

<u>Level</u>	<u>Heterotrophic Plate Count¹ and Dip Slide Result</u>	<u>Process Triggered by Test Results</u>
<u>1</u>	<u><10,000 CFU/ml</u>	<u>Maintain water chemistry and biocide levels.</u>
<u>2</u>	<u>≥ 10,000 CFU/ml to <100,000 CFU/ml</u>	<u>Initiate immediate disinfection by increasing biocide concentration or using a different biocide within 24 hours, review treatment program, retest water within 3-7 days. Subsequent test results must be interpreted in accordance with this Table until level 1 is reached.</u>
<u>3</u>	<u>≥ 100,000 CFU/ml to <1,000,000 CFU/ml</u>	<u>Initiate immediate disinfection by increasing biocide concentration or using a different biocide within 24 hours, reviewing treatment program, performing visual inspection to evaluate need to perform cleaning and further disinfection. Retest water within 3-7 days. Subsequent test results must be interpreted in accordance with this Table until level 1 is reached.</u>
<u>4</u>	<u>≥ 1,000,000 CFU/ml</u>	<u>Initiate immediate disinfection by increasing biocides within 24 hours. Within 48 hours perform remediation of the tower by hyperhalogenating², cleaning, and flushing. Review treatment program, retest water within 3-7 days. Subsequent test results must be interpreted in accordance with this Table until level 1 is reached.</u>

1. Performed by an appropriately accredited Laboratory (e.g. NELAP, AALA).

2. At a minimum, dose the cooling water system with 5 to 10 ppm Free Halogen Residual for at least 1 hour; pH 7.0 to 7.6.

§8-06 System shutdown and start-up; commissioning and decommissioning cooling towers.

(a) Full system shutdown. Procedures to shut a cooling tower system must conform to the manufacturers' recommendations. When shut down, the system must be completely drained and protected from offline contamination.

(b) Full system startup. At a minimum, before cooling tower system start-up, an owner must clean and disinfect a cooling tower that has been shut down or idle for more than five days, in accordance with §17-194.1 of the Administrative Code. Cleaning and disinfection must be done no later than 15 days before the first seasonal use of such tower. The maintenance program and plan must include detailed seasonal and idle period startup procedures that include, at a minimum:

(1) Either fully clean and disinfect, drain to waste and disinfect, or sufficiently hyperhalogenate the recirculated water before startup; and

(2) Before the startup of a cooling tower system after an extended shutdown of five or more days, collect samples for *Legionella* culture and take actions required by Table 8-1 when results are received; and

(3) Before seasonal startup of a system that has been fully shut down, perform a pre-startup inspection by a qualified person.

(c) *Commissioning new cooling towers.* Newly installed cooling tower systems must be cleaned and disinfected prior to operation according to this section and the maintenance program and plan, and be registered with the Department of Buildings cooling tower registration system in accordance with § 28-317.3 of the Administrative Code.

(d) *Removal or permanently discontinuing use of cooling towers.* The owner of a cooling tower must notify the Department of Buildings electronically within 30 days after removing or permanently discontinuing use of a cooling tower in accordance with § 28-317.3.1 of the Administrative Code. Such notice must include a statement that the cooling tower has been drained and sanitized in accordance with this section.

§8-07 Records.

(a) *Records.* An owner must keep for at least three (3) years in the building where a cooling tower is located or in an adjacent building or structure on the same campus, complex, lot, mall or on-site central engineering division a record of any maintenance, inspection, deficiency, corrective action, water treatment, test result, cleaning or disinfection performed on the tower.

(b) *Certification.* The owner of a cooling tower must file an annual certification each year as specified by the Department of Buildings, indicating that such tower was inspected, tested, cleaned and disinfected in accordance with the maintenance program and plan, as required by § 28-317.5 of the Administrative Code. The certification must document any deviations from compliance with the maintenance program and plan and the corrective actions taken to address any deficiencies.

(c) *Posting.* The owner must post the Department of Buildings Cooling Tower Registration Number that has been assigned to that cooling tower on each cooling tower. The Registration Number must be posted on a sign or plate that is securely fastened to the cooling tower in a location that is conspicuously visible and must be constructed of a durable, weather resistant material.

§8-08 **Modification.** The Commissioner or designee may grant a modification when strict application of any provision of this Chapter presents practical difficulties or unusual hardships. The Commissioner in a

specific instance may modify the application of such provision consistent with the general purpose of this Chapter and in compliance with Administrative Code §17-194.1 and upon such conditions as, in his or her opinion, are necessary to protect the health or safety of the public.

§8-09 Penalties. The following penalties shall be imposed for sustained initial and repeat violations. All penalties, except for those alleging a violation of the State Sanitary Code, must be doubled if the respondent fails to appear to answer such violation and is found in default.

<u>Section of Law</u>	<u>Description</u>	<u>Penalty: First violation</u>	<u>Repeat violation(s)</u>
<u>24 RCNY §8-03</u>	<u>No maintenance program and plan</u>	<u>\$1000</u>	<u>\$2000</u>
<u>24 RCNY§8-03</u>	<u>Maintenance program and plan incomplete or not on premises</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-04(a)</u>	<u>Routine monitoring not conducted, documented at least once a week when tower is in use</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY§8-04(b)</u>	<u>Compliance inspections not conducted, documented at least once every 90 days when the tower is in use</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-04(c)</u>	<u>Routine maintenance according to maintenance program and plan not conducted or documented</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY§8-04(d)</u>	<u>Twice yearly or other required cleaning not conducted or documented</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-04(e)</u>	<u>Aerosol control do not meet manufacturer's design specifications or drift loss reduction requirements in new or existing towers when required</u>	<u>\$1000</u>	<u>\$2000</u>
<u>24 RCNY§8-05(a)</u>	<u>Daily automatic or approved alternative water treatment plan not provided</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY§8-05(b)</u>	<u>Cooling water system not continually recirculated and no acceptable alternative</u>	<u>\$500</u>	<u>\$1000</u>

<u>24 RCNY §8-05(c)(1)</u>	<u>Use of an unqualified biocide applicator</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(c)(2)</u>	<u>Use of an unregistered biocide product</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(c)(3)</u>	<u>No records of all chemicals and biocides added</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(c)(4)</u>	<u>Sufficient quantities and combinations of chemicals not added as specified in the maintenance program and plan</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(d)</u>	<u>Using unacceptable alternative non-chemical water treatment device</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(e)</u>	<u>Use of captured rainwater or recycled water as makeup water not in accordance with approved alternative water source plan</u>	<u>\$1000</u>	<u>\$2000</u>
<u>24 RCNY §8-05(f)(1)</u>	<u>Minimum daily water quality measurements not taken or recorded</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(f)(2)</u>	<u>Failure to collect, analyze or record weekly biological process control indicators</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(f)(3)</u>	<u>Legionella samples not collected or analyzed, or results not recorded or reported to the Department as required</u>	<u>\$1000</u>	<u>\$2000</u>
<u>24 RCNY §8-05(f)(4)</u>	<u>Failure to monitor and sample from representative locations and times</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-05(f)(5)</u>	<u>Required corrective actions not taken based on bacteriological results</u>	<u>\$1000</u>	<u>\$2000</u>
<u>24 RCNY §8-06(a)</u>	<u>Improper or inadequate shutdown procedures</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-06(b)(1)</u>	<u>Improper or inadequate start-up procedures</u>	<u>\$500</u>	<u>\$1000</u>

<u>24 RCNY §8-06(b)(2)</u>	<u>Legionella samples not collected, analyzed before system start-up</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-06(c)</u>	<u>New cooling tower not or inadequately cleaned and disinfected prior to operating</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-07(a)</u>	<u>Failure to document all inspections, logs, tests, cleaning, and disinfection in accordance with the maintenance program and plan</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-07(a)</u>	<u>Failure to retain records for at least 3 years</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-07(a)</u>	<u>Required records not kept at the cooling tower premises</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-07(c)</u>	<u>Department of Buildings Cooling Tower Registration Number not posted as required</u>	<u>\$500</u>	<u>\$1000</u>
<u>24 RCNY §8-07(d)</u>	<u>Records not made immediately available to Department upon request</u>	<u>\$500</u>	<u>\$1000</u>
<u>State Sanitary Code Part 4</u>	<u>Miscellaneous provisions</u>	<u>\$250</u>	<u>\$250</u>