

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

CAMPUS IDENTIFICATION:	DUTCHESS COMMUNITY COLLEGE 53 PENDELL ROAD POUGHKEEPSIE NY 12601
REGISTRATION IDENTIFICATION	BALTIMORE AIR COIL MODEL VT1-N510-PC SERIAL # 99106441 NYS DOH ID #1454 BALTIMORE AIR COIL MODEL VT1-N510-PC SERIAL # U001627601 NYS DOH ID# 1467
PERSON (TITLE OR NAME) RESPONSIBLE FOR MAINTENANCE AND REPORTING THE DOH AS REQUIRED:	DUTCHESS COMMUNITY COLLEGE HVAC SUPERVISOR
PERSON/ENTITY WHO CONDUCTS FORMAL INSPECTIONS:	CHEMENERGY WATER TREATMENT 8 INTERSTATE AVENUE ALBANY, NY 12205 PHONE 518-432-4282
PERSON/ENTITY WHO TREATS THE COOLING TOWERS:	CHEMENERGY WATER TREATMENT 8 INTERSTATE AVENUE ALBANY, NY 12205 PHONE 518-432-4282

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Table of Contents

General

Plan Review and Availability

Plan Authority and References

Records Retention

Routine Inspection, Cleaning and Treatment

Biological Testing and Action Plans

HPC Activity

Legionella Activity

Emergency Legionella Sample Collection - Triggers and Actions

Emergency Disinfection and Decontamination Plan

Start Up and Shut Down Plan

Discontinued Use

Annual Certification

List of DOH Routine Reporting Triggers

Appendices

- A. Plan History Log
- B. NYS Department of Health Regulations
- C. List of Registered Cooling Towers and Their Detailed Information
- D. Maintenance and Service Logs By Tower including lab results
- E. Safety Data Sheets for Chemicals Used in the Maintenance of the Cooling Towers
- F. DOH Notification Log

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

General:

The following cooling towers are present on Dutchess Community College Campus. All have been registered by the Dutchess Community College Physical Plant HVAC Supervisor with the NYS Department of Health. Details can be found in Appendix C.

Hudson Hall Cooling North Tower Serial Number: 99106441 NYS DOH ID# 1454
Hudson Hall Cooling South Tower Serial Number: U001627601 NYS DOH ID# 1467

Plan Review and Availability:

This plan will be reviewed on an annual basis by DUTCHESS COMMUNITY COLLEGE SAFETY COORDINATOR.

A copy of this plan will be kept on the premises where the cooling tower is located. It will be made available to the local representatives of State Department of Health immediately upon request.

Plan Authority and References:

- **NYS Department of Health Emergency Regulations (included here as Appendix B)**
- http://www.health.ny.gov/diseases/communicable/legionellosis/docs/emerg_regs.pdf
- ASHRAE 188 (2015) *Legionellosis: Risk Management for Building Water Systems (ANSI/ASHRAE 188-2015)*, www.ashrae.org
- ASHRAE Guideline 12 (2000) *Minimizing the Risk of Legionellosis Associated with Building Water Systems*, www.ashrae.org
- Cooling Technology Institute (CTI) Legionellosis. *Guideline: Best Practices for Control of Legionella*, CTI Guidelines WTB-148 (08) <http://www.cti.org>.
- OSHA eTools: Legionnaires Disease, <https://www.osha.gov/dts/osta/otm/legionnaires/index.html>
- Centers for Disease Control and Prevention, *Guidelines for Environmental Infection Control in Health-Care Facilities; Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC); U.S. Department of Health and Human Services Centers for*

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Disease Control and Prevention (CDC) Atlanta, GA 30333 (2003); page 225.

http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf

Records Retention:

All documents on findings, deficiencies, corrective actions, cleaning and disinfection, and tests performed to comply with the regulations, and all certifications, will be maintained for at least three calendar years.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Routine Inspection, Cleaning and Treatment

All cooling towers will be subject to monthly inspections and treatment adjustment during the period of use.

Inspections shall include an evaluation of

- (i) the cooling tower and associated equipment for the presence of organic material, biofilm, algae, and other visible contaminants;
- (ii) the general condition of the cooling tower, basin, packing material, and drift eliminator;
- (iii) water make-up connections and control;
- (iv) proper functioning of the conductivity control; and
- (v) proper functioning of all dosing equipment (pumps, strain gauges)

Should the inspection show visible debris in the basin and/or other objectionable conditions, corrective action will be commenced immediately by the service provider (Chemenergy Water Treatment) under the supervision of Dutchess Community College HVAC Supervisor.

All persons who apply biocides will hold Class 7G commercial pesticide applicator certification, or pesticide technician status, from the NYS Department of Conservation, and act within the scope of the regulations.

All chemicals used in the treatment and cleaning of cooling towers will be approved by the Campus. See Appendix E for SDS details.

All biocides used will be registered with the NYS Department of Conservation as required.

The following is all equipment and chemicals that will be used for the purpose of treating the open recirculating loop:

Equipment:

Neptune Chemical Pump Series PZ Pulse Metering Pump

Advantage Controls Inc. Model 2-AM-5 Controller

Chemicals:

See chemical list in Appendix E

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Continuous Routine Treatment will be followed:

Cooling Technology Institute WTB-148 (08)

Routine Treatment Continuous (always preferred)

- Continuous free residuals of 0.5 to 1.0 ppm as Cl₂ in the cooling towers hot returns. Ensure adequate distribution.
- Effectiveness decreases with increasing pH; bromine is relatively more effective at pH 8.5-9.0.
- Stabilized halogen products should be added according to label instructions.
- Discharge of water to surface water may require dehalogenation.
- Biodispersants may aid on efficacy of biocide.
- May require periodic nonoxidizing products.

Intermittent use of Halogens

- Free halogen residual of 1.0 to 2.0 ppm as Cl₂ and hold for at least one hour each day. Monitor throughout the system.
- Stabilized halogens should be added per label.
- Use bulk water sample and sessile counts and deposit examination to ensure that the residual are adequate.
- Biodispersants may increase efficacy.
- Discharge of water to surface water may require dehalogenation.
- Biodispersants may aid on efficacy of biocide.
- May require periodic nonoxidizing products.

Routine on-line Disinfection Hyper-halogenation

(used for leaks, heavy biofouling, poor quality make-up water, periods of stagnation, etc.)

- 5 ppm free halogen residual for at least 6 hours
- Especially needed if HPC >100,000 CFU/ml or legionella >100 CFU/ml

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Biological Testing and Remedial Action Plans

HPC Activity:

A dip slide or HPC will be taken from each basin and analyzed during the seasonal operation that runs from May to October. ONCE BETWEEN APRIL 15 AND MAY 31; ONCE BETWEEN JULY 1 AND AUGUST 15; AND ONCE BETWEEN SEPTEMBER 1 AND OCTOBER 15. (*Note: NYS DOH requires sampling period to not exceed 90 days during periods of use.*)

The biocide regimen will be presumed adequate if the dip slide is found to be less than 10,000 CFU/ml.

If the dip slide is *greater than 10,000 CFU/ml* the biocide regimen will be immediately examined and modified to correct conditions. Retesting will occur within 30 calendar days. Modification to the treatment regiment may be required.

All results and actions will be maintained by the Physical Plant Department: see Appendix D.

Reference: Cooling Technology Institute WTB-148

Recommended Targets Routine Treatment of Cooling Water Systems (from CTI WTB-148(08))

Parameter	Dipslides	Agar Pour Plate or Petri film	Microscopic Examination
Plank tonic Counts (bulk water)	<10,000 CFU/ml	<10,000 CFU/ml	No higher life forms
Sessile Counts (surfaces)	<100,000 CFU/cm ²	<100,000 CFU/cm ²	No higher life forms
Deposits	NA	NA	No higher life forms

Legionella Activity:

Non-emergency Legionella sampling will be conducted at the following triggers:

FAILURE OF A DOSING SYSTEM OR INDICATIONS OF MAINTENANCE CONDITIONS THAT MAY HAVE PERMITTED AMPLIFICATION OF MICROBIAL POPULATION.

- WHEN THE TOWER IS OFF-LINE FOR MORE THAN 5 DAYS.
- WHEN THE HPC COUNT EXCEEDS 10,000 CFU/ML
- MIDWAY THROUGH THE COOLING SEASON

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

- ONCE BETWEEN APRIL 15 AND MAY 31; ONCE BETWEEN JULY 1 AND AUGUST 15; AND ONCE BETWEEN SEPTEMBER 1 AND OCTOBER 15.
- LEGIONELLA SAMPLING IS EXPECTED TO BE CONDUCTED ONLY UNDER THE CONDITIONS LISTED BELOW UNDER EMERGENCY LEGIONELLA SAMPLE COLLECTION.

Results from Legionella testing will result in the immediate corrective actions found in Appendix 4-A to the regulation, below.

Emergency Legionella Sample Collection – Triggers and Actions

Per NYS regulation, emergency sample collection and submission of samples for Legionella culture testing will be conducted in the case of events including, but not limited to:

- (i) power failure of sufficient duration to allow for the growth of bacteria;
- (ii) loss of biocide treatment sufficient to allow for the growth of bacteria;
- (iii) failure of conductivity control to maintain proper cycles of concentration;
- (iv) a determination by the commissioner that one or more cases of legionellosis is or may be associated with the cooling tower, based upon epidemiologic data or laboratory testing; and
- (v) any other conditions specified by the commissioner.

Sample collection will be coordinated with the service provider. Results will be interpreted immediately upon receipt and corrective actions will be immediately implemented. All records and analysis will be maintained see Appendix E.

The samples will be analyzed by a laboratory with both New York State ELAP certification and CDC ELITE certification.

The results will trigger immediate action based on Appendix 4-A in the regulations. All results and actions will be logged in service reports see Appendix D.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

DOH Appendix 4-A Interpretation of Legionella Culture Results from Cooling Towers

LEGIONELLA TEST RESULTS IN CFU/ML	APPROACH	PRESCRIBED ACTION
No detection (< 10 CFU /ml)	Maintain treatment program and Legionella monitoring.	<p>Online disinfection means – Dose the cooling tower water system with either a different biocide or a similar biocide at an increased concentration than currently used.</p> <p>Online decontamination means – Dose the recirculation water with a chlorine-based compound equivalent to at least 5 mg/l (ppm) free residual chlorine for at least one hour; pH 7.0 to 7.6.</p> <p>System decontamination means – Maintain 5 to 10 mg/l (ppm) free residual chlorine for a minimum of one hour; drain and flush with disinfected water; clean wetted surface; refill and dose to 1 – 5 mg/l (ppm) of free residual chlorine at pH 7.0 – 7.6 and circulate for 30 minutes. Refill, re-establish treatment and retest for verification of treatment.</p>
For levels at ≥ 10 CFU /ml but < 1000 CFU /ml perform the following:	<p>Review treatment program.</p> <p>Institute immediate online disinfection to help with control</p> <p>Retest the water in 3 – 7 days.</p> <ul style="list-style-type: none"> • Continue to retest at the same time interval until two consecutive readings show acceptable improvement, as determined by a person identified in 10 NYCRR 4.6. Continue with regular maintenance strategy. • If < 100 CFU /ml repeat online disinfection and retest. • If ≥100 CFU /ml but < 1000 CFU /ml further investigate the water treatment program and immediately perform online disinfection. Retest and repeat attempts at control strategy. <p>If ≥ 1000 CFU /ml undertake control strategy as noted below.</p>	
For levels ≥ 1000 CFU /ml perform the following:	<p>Review the treatment program</p> <p>Institute immediate online decontamination to help with control</p> <p>Retest the water in 3 – 7 days.</p> <ul style="list-style-type: none"> • Continue to retest at the same time interval until two consecutive readings show acceptable improvement, as determined by a person identified in 10 NYCRR 4.6. Continue with regular maintenance strategy. • If < 100 CFU /ml repeat online disinfection and retest; • If ≥ 100 CFU /ml but < 1000 CFU /ml further investigate the water treatment program and immediately perform online disinfection. Retest and repeat attempts at control strategy. <p>If ≥ 1000 CFU /ml carry out system decontamination</p>	

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Emergency Disinfection and Decontamination Plan

THE FOLLOWING DISINFECTION AND DECONTAMINATION PLAN AS RECOMMENDED BY THE CDC WILL BE FOLLOWED.

From Centers for Disease Control and Prevention

http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf

Guidelines for Environmental Infection Control in Health-Care Facilities; Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC); U.S. Department of Health and Human Services Centers for Disease Control and Prevention (CDC) Atlanta, GA 30333 (2003); Page 225

4. Procedure for Cleaning Cooling Towers and Related Equipment

I. Perform these steps prior to chemical disinfection and mechanical cleaning.

A. Provide protective equipment to workers who perform the disinfection, to prevent their exposure to chemicals used for disinfection and aerosolized water containing *Legionella* spp. Protective equipment may include full-length protective clothing, boots, gloves, goggles, and a full- or half-face mask that combines a HEPA filter and chemical cartridges to protect against airborne chlorine levels of up to 10 mg/L.

B. Shut off cooling tower.

1. Shut off the heat source, if possible.
2. Shut off fans, if present, on the cooling tower/evaporative condenser (CT/EC).
3. Shut off the system blowdown (i.e., purge) valve.
4. Shut off the automated blowdown controller, if present, and set the system controller to manual.
5. Keep make-up water valves open.
6. Close building air-intake vents within at least 30 meters of the CT/EC until after the cleaning procedure is complete.
7. Continue operating pumps for water circulation through the CT/EC.

II. Perform these chemical disinfection procedures.

A. Add fast-release, chlorine-containing disinfectant in pellet, granular, or liquid form, and follow safety instructions on the product label. Use EPA-registered products, if available. Examples of disinfectants include sodium hypochlorite (NaOCl) or calcium hypochlorite (Ca[OCl]₂), calculated to achieve initial free residual chlorine (FRC) of 50 mg/L: either a) 3.0 lbs [1.4 kg] industrial grade NaOCl [12%–15% available Cl] per 1,000 gallons of CT/EC water; b) 10.5 lbs [4.8 kg] domestic grade NaOCl [3%–5% available Cl] per 1,000 gallons of CT/EC water; or c) 226 0.6 lb [0.3 kg] Ca[OCl]₂ per 1,000 gallons of CT/EC water. If significant biodeposits are present, additional chlorine may be required. If the volume of water in the CT/EC is unknown, it can be estimated (in gallons) by multiplying either the recirculation rate in gallons per minute by 10 or the refrigeration capacity in tons by 30. Other appropriate compounds may be suggested by a water-treatment specialist.

B. Record the type and quality of all chemicals used for disinfection, the exact time the chemicals were added to the system, and the time and results of FRC and pH measurements.

C. Add dispersant simultaneously with or within 15 minutes of adding disinfectant. The dispersant is best added by first dissolving it in water and adding the solution to a turbulent zone in the water

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

system. Automatic-dishwasher compounds are examples of low- or nonfoaming, silicate based dispersants. Dispersants are added at 10–25 lbs (4.5–11.25 kg) per 1,000 gallons of CT/EC water.

D. After adding disinfectant and dispersant, continue circulating the water through the system. Monitor the FRC by using an FRC-measuring device with the DPD method (e.g., a swimming pool test kit), and measure the pH with a pH meter every 15 minutes for 2 hours. Add chlorine as needed to maintain the FRC at >10 mg/L. Because the biocidal effect of chlorine is reduced at a higher pH, adjust the pH to 7.5–8.0. The pH may be lowered by using any acid (e.g., muriatic acid or sulfuric acid used for maintenance of swimming pools) that is compatible with the treatment chemicals.

E. Two hours after adding disinfectant and dispersant or after the FRC level is stable at >10 mg/L, monitor at 2-hour intervals and maintain the FRC at >10 mg/L for 24 hours.

F. After the FRC level has been maintained at >10 mg/L for 24 hours, drain the system. CT/EC water may be drained safely into the sanitary sewer. Municipal water and sewerage authorities should be contacted regarding local regulations. If a sanitary sewer is not available, consult local or state authorities (e.g., a department of natural resources or environmental protection) regarding disposal of water. If necessary, the drain-off may be dechlorinated by dissipation or chemical neutralization with sodium bisulfite.

G. Refill the system with water and repeat the procedure outline in steps 2–7 in I-B above.

III. Perform mechanical cleaning.

A. After water from the second chemical disinfection has been drained, shut down the CT/EC.

B. Inspect all water-contact areas for sediment, sludge, and scale. Using brushes and/or a low pressure water hose, thoroughly clean all CT/EC water-contact areas, including the basin, sump, fill, spray nozzles, and fittings. Replace components as needed.

C. If possible, clean CT/EC water-contact areas within the chillers.

IV. Perform these procedures after mechanical cleaning.

A. Fill the system with water and add chlorine to achieve an FRC level of 10 mg/L.

B. Circulate the water for 1 hour, then open the blowdown valve and flush the entire system until the water is free of turbidity.

C. Drain the system.

D. Open any air-intake vents that were closed before cleaning.

E. Fill the system with water. The CT/EC may be put back into service using an effective water treatment program.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

In addition to this plan, all required actions for positive legionella cultures specific by NYS DOH will be followed, including procedures for online disinfection, online decontamination, and system decontamination.

<p>Online disinfection means – Dose the cooling tower water system with either a different biocide or a similar biocide at an increased concentration than currently used.</p>

<p>Online decontamination means – Dose the recirculation water with a chlorine-based compound equivalent to at least 5 mg/l (ppm) free residual chlorine for at least one hour; pH 7.0 to 7.6.</p>

<p>System decontamination means – Maintain 5 to 10 mg/l (ppm) free residual chlorine for a minimum of one hour; drain and flush with disinfected water; clean wetted surface; refill and dose to 1 – 5 mg/l (ppm) of free residual chlorine at pH 7.0 – 7.6 and circulate for 30 minutes. Refill, re-establish treatment and retest for verification of treatment.</p>

April 1, 2016

Start Up and Shut Down Plan

Cooling towers must be cleaned and disinfected when shut down for more than five days.

ASHRAE 188 Summary

7.2.5 Shutdown and Start-Up

- to manage hazardous conditions associated with operation of fans during untreated water conditions
- Shutdown that included all chemical pretreatment steps, pump cycling protocols, and procedures for system drainage for shutdown periods longer than the duration specified by the program Team.
- Startup from a drained system.
- Start up from an undrained (stagnant) system that exceeds the number of idle days specified by the Program Team.

ASHRAE Guidelines 12-2000 Summary from 7.6.3

When the system is to be shut down for a period of more than three days, it is recommended that the entire system (cooling tower, system piping, heat exchangers, etc.) be drained to waste. When draining the system is not practical during shutdowns of short duration, the stagnant cooling water must be pretreated with an appropriate biocide regimen before tower start-up.

Shut down for drained system

Prior to operating the cooling tower, fill with water:

- Utilize the services of the water treatment supplier and treat with a previously used biocide. Maintain the maximum recommended biocide residual (for the specific biocide) for a sufficient period of time (residual and time will vary with the biocide) to bring the system under good biological control.
- Treat the system with sodium hypochlorite to a level of 4 to 5 mg/L (ppm) free chlorine residual at a pH of 7.0 to 7.6. The chlorine residual must be held at 4 to 5 mg/L (ppm) for six hours.
- Once one of these two biocidal treatments has been successfully completed, the fan can be turned on and the system returned to service. Resume the standard water treatment program (including biocidal treatment).

Start-Up for Undrained (Stagnant) Systems

- Remove accessible solid debris from the cooling tower sump and from any remote storage tank(s) that may be used.
- Perform one of the two biocide pretreatment procedures (described in "Start-Up for Drained Systems") directly to the cooling tower sump or remote storage tank. Do not circulate stagnant bulk cooling water over cooling tower fill or operate cooling tower fans during pretreatment.
- Stagnant cooling water may be circulated with the main cooling system pump(s) if tower fill is bypassed. Otherwise, add approved biocide directly to the bulk water source and mix with either manual or by sidestream flow methods. Take care to prevent the creation of aerosol spray from the stagnant cooling water from any point in the cooling water system.
- After biocidal pretreatment has been successfully completed, the cooling water should be circulated over the tower fill with fans off. When biocide residual is maintained at a satisfactory level for at least six hours, the cooling tower fans may be operated.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Discontinued Use

The Campus will notify the Department of Health within 30 days after removing or permanently discontinuing use of a cooling tower. The notice will include a statement that such cooling tower has been disinfected and drained in accordance with the procedures set forth in the shutdown plan.

Annual Certification

Each year, Dutchess Community College HVAC Supervisor will certify to the Department of Health , that all cooling towers were inspected, tested, cleaned, and disinfected in compliance with the DOH regulations, that the condition of the cooling towers is appropriate for intended use, and that a maintenance program and plan has been developed and implemented.

List of DOH Routine Reporting Triggers

10 days	significant change in registration
10 days	routine culture sample collection, sample results, and date of any required remedial action;
10 days	legionella sample collection, sample results, and date of any required remedial action;
10 days	cleaning and disinfection
10 days	start and end of any shutdown for more than five days
10 days	certification
10 days	inspection
30 days	discontinued use

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Appendices

- A. Plan History Log
- B. NYS Department of Health Regulations
- C. List of Registered Cooling Towers and Their Detailed Information
- D. Maintenance and Service Logs By Tower including lab results
- E. Safety Data Sheets for Chemicals Used in the Maintenance of the Cooling Towers
- F. DOH Notification Log

April 1, 2016

Appendix B- NYS Department of Health Regulations:

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.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

(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.

4.3 Registration.

All owners of cooling towers shall register such towers with the department within 30 days after the effective date of this Part. Thereafter, all owners of cooling towers shall register such towers with the department prior to initial operation, and whenever any owner of the cooling tower changes. Such registration shall be in a form and manner as required by the commissioner and shall include, at a minimum, the following information:

- (a) street address of the building at which the cooling tower is located, with building identification number, if any;
- (b) intended use of the cooling tower;
- (c) name(s), address(es), telephone number(s), and email address(es) of all owner(s) of the building;
- (d) name of the manufacturer of the cooling tower;
- (e) model number of the cooling tower;
- (f) specific unit serial number of the cooling tower;
- (g) cooling capacity (tonnage) of the cooling tower;
- (h) basin capacity of the cooling tower;
- (i) whether systematic disinfection is maintained manually, through timed injection, or through continuous delivery;
- (j) the contractor or employee engaged to inspect and certify the cooling tower; and
- (k) commissioning date of the cooling tower.

4.4 Culture sample collection and testing; cleaning and disinfection.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

- (a) All owners of cooling towers shall collect samples and obtain culture testing:
- (1) within 30 days of the effective date of this Part, unless such culture testing has been obtained within 30 days prior to the effective date of this Part, and shall take immediate actions in response to such testing, including interpreting Legionella culture results, if any, as specified in Appendix 4-A.
 - (2) in accordance with the maintenance program and plan, and shall take immediate actions in response to such testing as specified in the plan, including interpreting Legionella culture results, if any, as specified in Appendix 4-A; provided that if a maintenance program and plan has not yet been obtained in accordance with section 4.6 of this Part, bacteriological culture samples and analysis (dip slides or heterotrophic plate counts) to assess microbiological activity shall be obtained, at intervals not exceeding 90 days while the tower is in use, and any immediate action in response to such testing shall be taken, including interpreting Legionella culture results, if any, as specified in Appendix 4-A.
- (b) Any person who performs cleaning and disinfection shall be a commercial pesticide applicator or pesticide technician who is qualified to apply biocide in a cooling tower and certified in accordance with the requirements of Article 33 of the Environmental Conservation Law and 6 NYCRR Part 325, or a pesticide apprentice under the supervision of a certified applicator.
- (c) Only biocide products registered by the New York State Department of Environmental Conservation may be used in disinfection.
- (d) All owners shall ensure that all cooling towers are cleaned and disinfected when shut down for more than five days.

4.5 Inspection and certification.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

(a) Inspection. All owners of cooling towers shall inspect such towers within 30 days of the effective date of this Part, unless such tower has been inspected within 30 days prior to the effective date of this Part. Thereafter, owners shall ensure that all cooling towers are inspected at intervals not exceeding every 90 days while in use. All inspections shall be performed by a: New York State licensed professional engineer; certified industrial hygienist; certified water technologist; or environmental consultant with training and experience performing inspections in accordance with current standard industry protocols including, but not limited to ASHRAE 188-2015, as incorporated by section 4.6 of this Part.

(1) Each inspection shall include an evaluation of:

- (i) the cooling tower and associated equipment for the presence of organic material, biofilm, algae, and other visible contaminants;
- (ii) the general condition of the cooling tower, basin, packing material, and drift eliminator;
- (iii) water make-up connections and control;
- (iv) proper functioning of the conductivity control; and
- (v) proper functioning of all dosing equipment (pumps, strain gauges).

(2) Any deficiencies found during inspection will be reported to the owner for immediate corrective action. A person qualified to inspect pursuant to paragraph (a) of this section shall document all deficiencies, and all completed corrective actions.

(3) All inspection findings, deficiencies, and corrective actions shall be reported to the owner, recorded, and retained in accordance with this Part, and shall also be reported to the department in accordance with section 4.10 of this Part.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

(b) Certification. Each year, the owner of a cooling tower shall obtain a certification from a person identified in paragraph (a) of this section, that such cooling tower was inspected, tested, cleaned, and disinfected in compliance with this Part, that the condition of the cooling tower is appropriate for its intended use, and that a maintenance program and plan has been developed and implemented as required by this Part. Such certification shall be obtained by November 1, 2016, and by November 1 of each year thereafter. Such certification shall be reported to the department.

4.6 Maintenance program and plan.

(a) By March 1, 2016, and thereafter prior to initial operation, owners shall obtain and implement a maintenance program and plan developed in accordance with section 7.2 of Legionellosis: Risk Management for Building Water Systems (ANSI/ASHRAE 188-2015), 2015 edition with final approval date of June 26, 2015, at pages 7-8, incorporated herein by reference. The latest edition of ASHRAE 188-2015 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: 678-539-2129. Telephone: 404-636-8400, or toll free 1-800-527-4723.

Copies are available for inspection and copying at: Center for Environmental Health, Corning Tower Room 1619, Empire State Plaza, Albany, NY 12237.

(b) In addition, the program and plan shall include the following elements:

- (1) a schedule for routine bacteriological sampling and analysis (dip slides or heterotrophic plate counts) to assess microbiological activity and a schedule for Legionella sampling and culture analysis; provided that where the owner is a general hospital or residential health care facility, as defined in Article 28 of the Public Health Law, routine testing shall be performed at a frequency in accordance with the direction of the department.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

(2) emergency sample collection and submission of samples for Legionella culture testing to be conducted in the case of events including, but not limited to:

- (i) power failure of sufficient duration to allow for the growth of bacteria;
- (ii) loss of biocide treatment sufficient to allow for the growth of bacteria;
- (iii) failure of conductivity control to maintain proper cycles of concentration; (iv) a determination by the commissioner that one or more cases of legionellosis is or may be associated with the cooling tower, based upon epidemiologic data or laboratory testing; and
- (v) any other conditions specified by the commissioner.

(3) immediate action in response to culture testing, including interpreting Legionella culture results, if any, as specified in Appendix 4-A; provided that where the owner is a general hospital or residential health care facility, as defined in Article 28 of the Public Health Law, the provisions shall additionally require immediately contacting the department for further guidance, but without any delay in taking any action specified in Appendix 4-A.

(c) An owner shall maintain a copy of the plan required by this subdivision on the premises where a cooling tower is located. Such plan shall be made available to the department or local health department immediately upon request.

4.7 Recordkeeping.

An owner shall keep and maintain records of all inspection findings, deficiencies, corrective actions, cleaning and disinfection, and tests performed pursuant to this Part, and certifications, for at least three years. An owner shall maintain a copy of the maintenance program and plan required by this Part on the

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

premises where a cooling tower is located. Such records and plan shall be made available to the department or local health department immediately upon request.

4.8 Discontinued use.

The owner of a cooling tower shall notify the department within 30 days after removing or permanently discontinuing use of a cooling tower. Such notice shall include a statement that such cooling tower has been disinfected and drained in accordance with the same procedures as set forth in the shutdown plan, as specified in the maintenance program and plan required pursuant to this Part.

4.9 Enforcement.

- (a) An officer, employee or agent of the department or local health department may enter onto any property to inspect the cooling tower for compliance with the requirements of this Part, in accordance with applicable law.
- (b) Where an owner does not register, obtain certification, clean or disinfect, culture test or inspect a cooling tower within the time and manner set forth in this Part, the department or local health department may determine that such condition constitutes a nuisance and may take such action as authorized by law. The department or local health department may also take any other action authorized by law.
- (c) A violation of any provision of this Part is subject to all civil and criminal penalties as provided for by law. Each day that an owner remains in violation of any provision of this Part shall constitute a separate and distinct violation of such provision.

4.10 Electronic registration and reporting.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

(a) (1) Within 30 days of the effective date of this Part, and thereafter within 10 days after any action required by this Part, owners shall electronically input the following information in a statewide electronic system designated by the commissioner:

- (i) registration information;
- (ii) date of last routine culture sample collection, sample results, and date of any required remedial action;
- (iii) date of any legionella sample collection, sample results, and date of any required remedial action;
- (iv) date of last cleaning and disinfection;
- (v) dates of start and end of any shutdown for more than five days;
- (vi) date of last certification and date when it was due;
- (vii) date of last inspection and date when it was due;
- (viii) date of discontinued use; and
- (ix) such other information as shall be determined by the department.

(2) The commissioner may suspend this requirement in the event that the electronic system is not available.

(b) The data in the system referenced in paragraph (a) shall be made publicly available, and shall be made fully accessible and searchable to any local health department. Nothing in this Part shall preclude a local health department from requiring registration and reporting with a local system or collecting fees associated with the administration of such system.

4.11 Health care facilities

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

- (a) All general hospitals and residential health care facilities, as defined in Article 28 of the Public Health Law, shall, as the department may determine appropriate:
 - (1) adopt a Legionella sampling plan for its facilities’ potable water distribution system;
 - (2) report the results of such sampling; and
 - (3) take necessary responsive actions.
- (b) With respect to such general hospitals and residential health care facilities, the department shall investigate to what extent, if any, requirements more stringent than those set forth in this Part are warranted.

4.12 Severability.

If any provisions of this Part or the application thereof to any person or entity or circumstance is adjudged invalid by a court of competent jurisdiction, such judgment shall not affect or impair the validity of the other provisions of this Part or the application thereof to other persons, entities, and circumstances.

Appendix 4-A

Interpretation of Legionella Culture Results from Cooling Towers	
Legionella Test Results in CFU ¹ /ml	Approach
No detection (< 10 CFU /ml)	Maintain treatment program and <i>Legionella</i> monitoring.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

<p>For levels at ≥ 10 CFU /ml but < 1000 CFU /ml perform the following:</p>	<ul style="list-style-type: none"> ○ Review treatment program. ○ Institute immediate <u>online disinfection</u>² to help with control ○ Retest the water in 3 – 7 days. <ul style="list-style-type: none"> ▪ Continue to retest at the same time interval until two consecutive readings show acceptable improvement, as determined by a person identified in 10 NYCRR 4.6. ○ Continue with regular maintenance strategy. <ul style="list-style-type: none"> ▪ If < 100 CFU /ml repeat <u>online disinfection</u>² and retest. ▪ If ≥ 100 CFU /ml but < 1000 CFU /ml further investigate the water treatment program and immediately perform <u>online disinfection</u>.² ○ Retest and repeat attempts at control strategy. ○ If ≥ 1000 CFU /ml undertake control strategy as noted below.
<p>For levels ≥ 1000 CFU /ml perform the following:</p>	<ul style="list-style-type: none"> ○ Review the treatment program ○ Institute immediate <u>online decontamination</u>³ to help with control ○ Retest the water in 3 – 7 days. <ul style="list-style-type: none"> ▪ Continue to retest at the same time interval until two consecutive readings show acceptable improvement, as determined by a person identified in 10 NYCRR 4.6. ○ Continue with regular maintenance strategy. <ul style="list-style-type: none"> ▪ If < 100 CFU /ml repeat <u>online disinfection</u>² and retest;

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

	<ul style="list-style-type: none">▪ If ≥ 100 CFU /ml but < 1000 CFU /ml further investigate the water treatment program and immediately perform <u>online disinfection</u>.² Re-test and repeat attempts at control strategy.▪ If ≥ 1000 CFU /ml carry out <u>system decontamination</u>⁴
<p>¹</p>	<p>Colony forming units.</p> <p>²</p> <p>Online disinfection means – Dose the cooling tower water system with either a different biocide or a similar biocide at an increased concentration than currently used.</p> <p>³</p> <p>Online decontamination means – Dose the recirculation water with a chlorine-based compound equivalent to at least 5 mg/l (ppm) free residual chlorine for at least one hour; pH 7.0 to 7.6.</p> <p>⁴</p> <p>System decontamination means – Maintain 5 to 10 mg/l (ppm) free residual chlorine for a minimum of one hour; drain and flush with disinfected water; clean wetted surface; refill and dose to 1 – 5 mg/l (ppm) of free residual chlorine at pH 7.0 – 7.6 and circulate for 30 minutes.</p> <p>Refill, re-establish treatment and retest for verification of treatment.</p>

A Regulatory Impact Statement, Regulatory Flexibility Analysis, Rural Area Flexibility Analysis and Job Impact Statement will be published in the Register within 30 days of the rule's effective date.

April 1, 2016

Emergency Justification

Improper maintenance of cooling towers can contribute to the growth and dissemination of *Legionella* bacteria, the causative agent of legionellosis. Legionellosis causes cough, shortness of breath, high fever, muscle aches, headaches and can result in pneumonia. Hospitalization is often required, and between 5-30% of cases are fatal. People at highest risk are those 50 years of age or older, current or former smokers, those with chronic lung diseases, those with weakened immune systems from diseases like cancer, diabetes, or kidney failure, and those who take drugs to suppress the immune system during chemotherapy or after an organ transplant. The number of cases of legionellosis reported in New York State between 2005-2014 increased 323% when compared to those reported in the previous ten year period.

Outbreaks of legionellosis have been associated with cooling towers. A cooling tower is an evaporative device that is part of a recirculated water system incorporated into a building's cooling, industrial process, refrigeration, or energy production system. 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*.

For example, in 2005, a cooling tower located at ground level adjacent to a hospital in New Rochelle, Westchester County resulted in a cluster of 19 cases of legionellosis and multiple fatalities. Most of the individuals were dialysis patients or companions escorting the patients to their dialysis session. One fatality was in the local neighborhood. The cooling tower was found to have insufficient chemical treatment. The entire tower was ultimately replaced by the manufacturer in order to maintain cooling for the hospital and to protect public health. In June and July of 2008, 12 cases of legionellosis

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

including one fatality were attributed to a small evaporative condenser on Onondaga Hill in Syracuse, Onondaga County. An investigation found that the unit was not operating properly and this resulted in the growth of microorganisms in the unit. Emergency biocide treatment was initiated and proper treatment was maintained. No new cases were then detected thereafter.

Recent work has shown that sporadic cases of community legionellosis are often associated with extended periods of wet weather with overcast skies. A study conducted by the New York State Department of Health that included data from 13 states and one United States municipality noted a dramatic increase in sporadic, community acquired legionellosis cases in May through August 2013. Large municipal sites such as Buffalo, Erie County reported 2- to 3fold increases in cases without identifying common exposures normally associated with legionellosis. All sites in the study except one had a significant correlation, with some time lag, between legionellosis case onset and one or more weather parameters. It was concluded that large municipalities produce significant mist (droplet) output from hundreds of cooling towers during the summer months. Periods of sustained precipitation, high humidity, cloud cover, and high dew point may lead to an “urban cooling tower” effect. The “urban cooling tower” effect is when a metropolitan area with hundreds of cooling towers acts as one large cooling tower producing a large output of drift, which is entrapped by humid air and overcast skies.

More recently, 119 cases of legionellosis that included 12 fatalities (8/12/15) occurred in Bronx, NY (July-August, 2015). This event was preceded by an outbreak in Co-Op City in the Bronx, from December 2014 to January 2015, which involved 8 persons and no fatalities. Both of these outbreaks have been attributed to cooling towers, and emergency disinfection of compromised towers helped curtail these outbreaks. These events highlight the need for proper maintenance of cooling towers.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

The heating, ventilation, and air-conditioning (HVAC) industry has issued guidelines on how to seasonally start a cooling tower; treat it with biocides and other chemicals needed to protect the components from scale and corrosion; and set cycles of operations that determine when fresh water is needed; and how to shut down the tower at the end of the cooling season. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has recently released a new Standard entitled *Legionellosis: Risk Management for Building Water Systems* (ANSI/ASHRAE Standard 188-2015). Section 7.2 of that document outlines components of the operations and management plan for cooling towers. The industry also relies on other guidance for specific treatment chemicals, emergency disinfection or decontamination procedures and other requirement.

However, none of the guidance is obligatory. Consequently, poor practice in operation and management can result in bacterial overgrowth, increases in legionellae, and mist emissions that contain a significant dose of pathogenic legionellae. This regulation requires that all owners of cooling towers ensure proper maintenance of the cooling towers, to protect the public and address this public health threat.

Further, these regulations require all general hospitals and residential health care facilities (i.e., nursing homes) to develop a sampling plan, report the results, and take necessary actions to protect the safety of their patients or residents. The details of each facility's sampling plan and remedial measures will depend on the risk factors for acquiring Legionnaires' disease in the population served by the hospital or nursing home.

Most people in nursing homes should be considered at risk, as residents are typically over 50 years of age. In general hospitals, persons at risk include those over 50 years of age, as well as those receiving chemotherapy, those undergoing transplants, and other persons housed on healthcare units

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

that require special precautions. Additional persons who might be at increased risk for acquiring Legionnaires' disease include persons on high-dose steroid therapy and persons with chronic lung disease. Certain facilities with higher risk populations, such as those with hematopoietic stem-cell transplant (HSCT) and solid organ transplant units, require more protective measures.

An environmental assessment involves reviewing facility characteristics, hot and cold water supplies, cooling and air handling systems and any chemical treatment systems. The purpose of the assessment is to discover any vulnerabilities that would allow for amplification of *Legionella* spp. and to determine appropriate response actions in advance of any environmental sampling for *Legionella*. Initial and ongoing assessment should be conducted by a multidisciplinary team that represents the expertise, knowledge and functions related to the facility's operation and service. A team should include, at a minimum, representatives from the following groups: Infection Control; Physical Facilities Management; Engineering; Clinicians; Laboratory; and Hospital Management.

Thus, to protect the public from the immediate threat posed by *Legionella*, the Commissioner of Health and the Public Health and Health Planning Council have determined it necessary to file these regulations on an emergency basis. Public Health Law § 225, in conjunction with State Administrative Procedure Act § 202(6) empowers the Council and the Commissioner to adopt emergency regulations when necessary for the preservation of the public health, safety or general welfare and that compliance with routine administrative procedures would be contrary to the public interest.

Also Available at NYS Department of Health Regulations:

http://www.health.ny.gov/diseases/communicable/legionellosis/docs/emerg_regs.pdf

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Appendix C- List of Registered Cooling Towers and Their Detailed Information

Hudson Hall, 141 Creek Road, Poughkeepsie, NY 12601

Cooling tower for air conditioning

Dutchess Community College, 53 Pendell Road, Poughkeepsie, NY 12601, 845-431-8653

Cooling tower manufacturer; Baltimore Air Coil

Model number; VT1-N510-PC

Unit 1 North Tower ID: 1454 SN: 99106441, Unit 2 South Tower ID: 1467 SN: U001627601

Cooling capacity; 510 Tons each

Basin capacity: 994 Gallons each

Systematic disinfection is maintained through continuous delivery

Contracted company engaged to inspect and certify the cooling tower is; CHEMENERGY WATER TREATMENT,
8 INTERSTATE AVENUE, ALBANY, NY 12205, PHONE 518-432-4282

Commission date; Unit 1 ID: 1451 8/16/1999; Unit 2 ID: 8/21/2000

April 1, 2016

Appendix D – Maintenance and Service Log by Tower

The service reports and lab results are available in the Physical Plant Department.

Dutchess Community College Cooling Tower Maintenance Program and Plan

April 1, 2016

Appendix E- Safety Data Sheets for Chemicals Used in the Maintenance of the Cooling Towers

Date of Acceptance by Campus	Product Name	General Use	Manufacturer	SDS Provided
3/31/2016	Opti-Kleen	Cooling Tower Treatment	Chemenergy	Yes
3/31/2016	Opti-2419	Cooling Tower Treatment	Chemenergy	Yes
3/31/2016	Corguard 520	Water Treatment	Chemenergy	Yes
4/1/2016	Bromicide Tablets	Water Treatment	BWA Water Additives US LLC	Yes
4/1/2016	6120 Powdered Detergent	Detergent	Chemenergy	Yes

****Safety Data Sheets are maintained on the Safety Data Sheet E-Library found on the MyDCC website.***

April 1, 2016

Appendix F- DOH Notification Log

4.10 Electronic registration and reporting.

(a) (1) Within 30 days of the effective date of this Part, and thereafter **within 10 days after any action required by this Part**, owners shall electronically input the following information in a statewide electronic system designated by the commissioner:

- registration information;
- date of last routine culture sample collection, sample results, and date of any required remedial action;
- date of any legionella sample collection, sample results, and date of any required remedial action;
- date of last cleaning and disinfection;
- dates of start and end of any shutdown for more than five days;
- date of last certification and date when it was due;
- date of last inspection and date when it was due;
- date of discontinued use; and
- such other information as shall be determined by the department.

(2) The commissioner may suspend this requirement in the event that the electronic system is not available.

(b) The data in the system referenced in paragraph (a) shall be made publicly available, and shall be made fully accessible and searchable to any local health department. Nothing in this Part shall preclude a local health department from requiring registration and reporting with a local system or collecting fees associated with the administration of such system.

4.8 Discontinued use.

The owner of a cooling tower shall notify the department within 30 days after removing or permanently discontinuing use of a cooling tower. Such notice shall include a statement that such cooling tower has been disinfected and drained in accordance with the same procedures as set forth in the shutdown plan, as specified in the maintenance program and plan required pursuant to this Part.

