Title: Cooling Tower Maintenance Program and Plan	
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Table of Contents

I. Purpose and Objective

This program and plan was established by Buffalo State College to ensure campus cooling tower and condenser systems are operated and maintained in a manner that complies with applicable regulations, issued by the New York State (NYS) Department of Health (DOH), NYS Department of Environmental Conservation (DEC), NYS Department of Labor (DOL), and the Occupational Safety and Health Administration (OSHA), and is protective of the public, workers, and the environment.

The objective of this plan is to minimize the risk and occurrence of Legionellosis with approaches that focus on the key issues of maintaining overall system cleanliness, providing good biological control, and eliminating stagnant water areas.

II. Roles and Responsibilities

2.1 Contact Information

Table 2-1
Contact Information

CAMPUS IDENTIFICATION:	SUNY BUFFALO STATE COLLEGE
NYS DOH WEBSITE REGISTRY WITH PASSWORDS:	AVAILABLE BY CONTACTING EH&S OFFICE 878-4038
PERSON (TITLE OR NAME) RESPONSIBLE FOR MAINTENANCE AS REQUIRED:	SCOT ECKERT, ASSOCIATE FACILITIES PROGRAM COORDINATOR, CAMPUS SERVICES, SUNY BUFFALO STATE 716-878-3143 OR 716-878-6111
PERSON (TITLE OR NAME) RESPONSIBLE FOR REPORTING TO THE DOH:	JOHN BLEECH, ENVIRONMENTAL PROGRAMS COORDINATOR, ENVIRONMENTAL HEALTH AND SAFETY OFFICE, SUNY BUFFALO STATE 716-878-6136 OR 716-878-4038
PERSON/ENTITY WHO CONDUCTS FORMAL INSPECTIONS:	BILL WILSON, FEEDWATER SYSTEMS 716-260-6020
PERSON(S)/ENTITY WHO TREATS THE COOLING TOWERS:	DOUGLAS RUTKOWSKI, CAMPUS SERVICES, SUNY BUFFALO STATE, 716-878-6111 BILL WILSON, FEEDWATER SYSTEMS, 716-260-6020
ERIE COUNTY DOH:	961-6800 OR 961-7898 (AFTER HOURS)

2.2 Campus Services - HVAC and Plumbers

Campus Services - HVAC and Plumbers shall:

* Perform routine screening, monitoring, servicing, water testing (for disinfectant residuals and other indictors), disinfection, decontamination, and cleaning of the campus cooling tower systems and other associated corrective actions necessary to assure the systems are maintained in a safe condition;

* Perform the above listed tasks under direction of the Associate Facilities Program Coordinator and advisement by the cooling tower Contracted Service Provider;

* Maintain NYS DEC pesticide licenses as applicable;

* Use good practices and perform work safely using required protective safety gear;

* Report deficiencies or discoveries of off-normal tower conditions to their immediate supervisor and Associate Facilities Program Coordinator.

2.3 Campus Services - Associate Facilities Program Coordinator

The Campus Services Associate Facilities Program Coordinator shall:

* Maintain a list of Campus Services employees that are qualified to maintain the campus cooling towers;

* Coordinate work by Campus Services - HVAC and Plumbers to inspect, test, service, treat, disinfect, decontaminate and clean the cooling towers and any other corrective actions as necessary;

* Assure cooling tower Contracted Service Provider performs required formal (90-day) inspections bacteriological sample collection and testing, annual certification and other servicing activities specified by this program plan and the regulations;

* Maintain records on tower equipment technical specifications to support maintenance activities and tower registrations with the NYS DOH;

* Review and assess written reports of inspections, testing, disinfection, cleaning and any other required activities, as outlined in this program plan, from the Contracted Service Provider. Assure reports are promptly transmitted to the Environmental Programs Coordinator;

2.4 Contracted Service Provider

The cooling tower Contracted Service Provider shall:

* Provide bacteriological and Legionella sample collection and testing (dip slides or HPC) services in accordance with the requirements of this program plan, NYS DOH regulatory requirements, and industry best practices as applicable;

* Perform formal (pre-start-up & 90-day) inspections in accordance with the requirements of this program plan, NYS DOH regulations, and industry best practices as applicable;

* Service or repair cooling tower system equipment at the direction of the Associate Facilities Coordinator;

* Oversee treatment, disinfection, and cleaning of cooling towers and advise Campus Services (HVAC and the Associate Facilities Coordinator) to assure cooling tower systems, including equipment and associated emissions and effluents, are operated, maintained, and discharged in a safe manner that is compliant with applicable NYS DOH and DEC regulations;

* Provide written reports of formal inspections, including findings and corrective actions, bacteriological test results, and Legionella test results in a timely fashion to Campus Services Associate Facilities Program Coordinator and Environmental Programs Coordinator in accordance with required by NYS DOH regulations;

* Assure only registered pesticides approved by DEC and EPA with proper labels, usage instructions and safety data sheets are provided to Campus Services for use;

* By October 23rd of each year, provide written annual certification to the Associate Facilities Program Coordinator and Environmental Programs Coordinator that all cooling towers were inspected, tested, cleaned, and disinfected in accordance with this program plan and applicable NYS DOH regulations.

2.5 Environmental Programs Coordinator

The Environmental Programs Coordinator shall:

* Obtain cooling tower equipment specifications and register new or updated cooling towers with the NYS DOH;

* Input regulatory-required cooling tower inspection reports, test results, and certifications into the NYS DOH reporting/registry website or file written reports as necessary to the DOH;

* Provide emergency notifications and reports to the NYS and Erie County DOH, as required by DOH regulations;

* Review and evaluate this program plan at least annually and update as necessary to conform with current NYS DOH, DEC, DOL, and OSHA regulations;

* Notify and advise the Associate Facilities Coordinator and Contracted Service Provider on requirements and regulatory changes affecting the cooling tower maintenance program to assure compliance;

* Serve as campus liaison to the NYS DOH or DEC for agency inquiries and inspections of the campus cooling tower systems;

* Compile individual pesticide usage reports from Campus Services employees holding NYS DEC pesticide licenses and submit annual usage report for Buffalo State College to the DEC.

III. General

3.1 Key Abbreviations and Definitions

"cfu/mL" means colony forming units per milliliter, a unit of measure for microbials and Legionella in a water sample.

"Cooling Tower" or "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.

"mg/L or ppm" means milligrams per liter or parts per million, a unit of measure for chemical constituents in a water sample.

"Online Decontamination" as specified by DOH regulations, means dose the recirculation water with a halogen-based compound (Cl or Br) equivalent to at least 5 mg/L (ppm) free residual halogen for at least one (1) hour.

"Online Disinfection" as specified by DOH regulations, means dose the cooling tower water system with either a different biocide or a similar biocide at a free residual increased concentration than currently used.

"System Decontamination" as specified by DOH regulations, means completing all fo the following steps: 1. Maintain between 5 to 10 mg/L (ppm) free residual halogen (ex. Chlorine) for a minimum of one hour; 2. Drain and flush with disinfected water; 3. Clean wetted surface; 4. Refill and dose to 1 to 5 mg/L (ppm) of free residual halogen and circulate for at least 30 minutes; and 5. (Drain and) refill, re-establish treatment and retest for verification of treatment. For chlorine treatment, the pH range should be 7.0 to 7.6. For bromine treatment, the pH range 7.0 to 8.7. At higher pH values the treatment times may need to be extended.

"Qualified Professional" or "Contract Service Provider Qualified Professional" means a NYS licensed professional engineer, certified industrial hygienist, certified water technologist or environmental consultant with training and experience in performing inspections in accordance with current industry protocols including, but not limited to ASHRAE 188.

"S.U." means Standard Units, a unit of measure for pH in water.

3.2 Cooling Tower/Condenser Locations

There are 22 cooling towers present on the Buffalo State College campus located at 1300 Elmwood Avenue, Buffalo, New York. As of August 2016, twenty one (22) towers have been commissioned and are registered with the NYS DOH.

The campus cooling tower inventory is listed in Table 3-1. Detailed information on each tower is contained in Appendix C. All towers are located on building roof tops where public access is restricted to maintenance employees and contractors.

TABLE 3-1
LIST OF COOLING TOWERS (22 TOTAL)

Cooling Tower Location Name	Mfr.	Model #	Mfr. Serial #	DOH ID#
Bulger Communications Center #1	Evapco	LRT-8-124	T011283	3713
Burchfield Penney (BP) Art Center #1	BAC	15146	U070228701	3232
BP Art Center #2	BAC	15146	U070228702	3235
Butler Library #1	BAC	15201	U013127501	3440
Butler Library #2	BAC	15201	U013127502	3445
Caudell Hall #1	Evapco	UT-19-48	14-692142	9516
Classroom Bldg. #1	BAC	15146-2	U013129901	3403
Classroom Bldg. #2	BAC	15146-2	U013129902	3430
Cleveland Hall #1	BAC	VTL 272-OM	U013128901	4107
Houston Gym #1	BAC	PT2-0809A-3K2	U135001103-01-01	3266
Houston Gym #2	BAC	PT2-0809A-3K2	U135001103-01-02	3287
Ice Rink #1 (Evaporative Condenser)	BAC	VC1-150	U041158701	3384
Science and Math Complex (SAMC) #1	Evapco	AT-112-618	9-375375	3753
SAMC #2	Evapco	AT-112-618	9-375374	3756
Student Apartment Complex (STAC) #1	Evapco	LRW-68-3-1	10-377774	3737
STAC #2	Evapco	LRW-68-3-1	10-377773	3744
STAC #3	Evapco	LRW-68-3-1	10-377772	3746
Student Union #1	BAC	VTL-171	U040438201	3319
Student Union #2	BAC	VTL-171	U040438204	3322
Technology Bldg. #1	Evapco	LPT-529	12-472959	3771
Technology Bldg. #2	Evapco	LPT-529	12-472960	3779
Twin Rise #2(to be commissioned in 2017)	BAC	VT0-065-J/X	U162722201-01-01	10723

3.3 Plan Review and Availability

This plan will be reviewed on an annual basis by the Environmental Programs Coordinator or the Environmental Health and Safety Director.

A copy of this plan will be kept on the campus premises, where the cooling towers are located. More specifically, it will be kept in the Environmental Health and Safety (EH&S) Office, Room 213, Clinton Center. Copies will be made available to the Erie County DOH or NYS DOH immediately upon request.

A copy will also be posted on the campus EH&S website and working (hard copies) will also be kept in the Campus Services (operations) center offices.

3.4 Plan Authority and References

1. NYS Department of Health Emergency Regulations (included here as Appendix B)
   http://www.health.ny.gov/diseases/communicable/legionellosis/docs/emerg_regs.pdf

2. NYS DOH Additions to Part 4 of Title 10 NYCRR, July 6, 2016,
   http://docs.dos.ny.gov/info/register/2016/july6/pdf/rulemaking%20activities.pdf

3. ASHRAE 188 (2015) *Legionellosis: Risk Management for Building Water Systems (ANSI/ASHRAE 188-2015)*, www.ashrae.org

4. ASHRAE Guideline 12 (2000) *Minimizing the Risk of Legionellosis Associated with Building Water Systems*, www.ashrae.org

5. Cooling Technology Institute (CTI) Legionellosis. *Guideline: Best Practices for Control of Legionella, CTI Guidelines WTB-148 (08)* http://www.cti.org.

6. OSHA eTools: Legionnaires Disease,
   https://www.osha.gov/dts/osta/otm/legionnaires/index.html

7. 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 Disease Control and Prevention (CDC) Atlanta, GA 30333 (2003); page 225.* http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf

3.5 Records Retention

All report and certification documents on inspections, findings, deficiencies, corrective actions, cleaning, disinfection, sampling and tests performed will be maintained for at least three (3) calendar years.

Documentation of annual certifications, formal (pre-start-up and 90-day) inspections, test reports, emergency disinfection/decontamination, cleaning and any other corrective actions to fulfill specific regulatory obligations will be maintained at the EH&S Office, in the Clinton Center Room 213.

Documentation for routine tower monitoring and servicing activities will be maintained in the Campus Services (operations) office in the Clinton Center.

IV. Worker Qualifications

4.1 Applying Biocides

Biocides include chemicals that kill biological growth and microbial organisms in cooling tower systems. Biocides include, *but are not limited to* Bromocide, Superchlor, Envirochlorite 25, sodium hypochlorite/chlorine dioxide and/or other chemicals which often have halogenated substances (examples: Bromine, Chlorine) as active ingredients. Biocides are used in in sanitizing, routine treatment, disinfection and emergency decontamination of cooling tower waters, including the tower water. All operations (Campus Services) employees and Contract Service Provider personnel, who apply biocides to cooling towers for these any other purposes will maintain a Class 7G commercial pesticide technician or Class 7G pesticide applicator license from the DEC.

Note: Application of expired biocides is prohibited by US EPA and NYS DEC regulations. The Contracted Service Provider shall ensure at all times that only approved biocides for treating cooling towers are available for use by campus personnel.

V. Chemicals, Instrumentation, and Safety Gear

5.1 Chemical Control and Other Key Operating Equipment

The following are used for controlling and dosing chemicals, including biocides, for treating open loops and/or disinfecting the cooling tower systems:

* ORP Meter/Controller
* Conductivity Meter/Controller
* Chemical Dosing Pumps.

Other cooling tower design aspects and operating equipment that are important to maintain in order to ensuring public safety include louvers, mist eliminators, spray nozzles, fill material and backflow prevention on make-up water supply.

5.2 Chemicals Used and Requirements

All chemicals to be used in the biocidal treatment of the towers shall be registered with the NYS DEC and EPA, as required, and also approved by the Buffalo State College EH&S Office and Campus Services Associate Facilities Program Coordinator prior to use. Chemical Safety Data Sheets can be found in Appendix F.

Chemicals used to treat campus cooling towers include:

* Bromicide –a bromo/chloro hydantoin based biocide;

* Sodium Chlorite (Envirochlorite 25) and Sodium Hypochlorite (Superchlor) – Chorine active ingredient. Used for sanitization, disinfection, decontamination and as an alternate (routine) treatment;

* Acids and bases – as necessary to control pH;

* Biodispersants and corrosion inhibitors – as necessary.

All chemical containers including those used as intermediaries to transfer or transport from a primary container to dosing equipment shall be properly labelled to identify contents in accordance with applicable DEC and EPA regulations .

5.3 Personal Protective Equipment (PPE) and Safety Precautions

Potential hazards associated with maintaining cooling tower systems include water biological hazards, chemical, and/or thermal hazards. This includes:

1. Microbial organisms, such as legionella in the bulk water or aerosol droplets, which can present an eye, inhalation, and/or ingestion pathway exposure hazard;

2. Chemicals, primarily halogens, which can pose a inhalation, ingestion, eye, and/or dermal/absorption hazards;

3. Excessive heat on equipment or water due to continual operation or malfunction.

Accordingly, the following precautions shall be followed by all Campus Services (operations) and Contracted Service Provider employees:

1. Tower/condenser liquids and surfaces shall be checked for excessive heat or temperature before contacting.

2. *At a minimum*, all Campus Services (operations) and Contracted Service Provider employees shall wear PPE including chemical resistant gloves, coveralls (e.g. tyvek), vented goggles and ½ face respirators* fitted with HEPA cartridges particulate filter cartridges when:

   a. handling biocide chemicals where there is a potential airborne or contact exposure hazard;

   b. working within 30 feet of cooling tower systems unless the tower system is not operating; or

   c. tower equipment is known to be malfunctioning, for example from panel indicators alarm. Note under this upset condition, assessment of the system for additional safety hazards, such as energy/electrical shall be performed and precautions taken accordingly.

3. In addition to the above, any other instructions for PPE use specified in the chemical Safety Data Sheets (Appendix F) shall be followed.

4. Rubber gloves shall be worn at all times when collecting and handling water samples obtained from cooling tower/condenser systems.

Safety equipment supplies can be obtained at the central stockroom in the Clinton Center.

** Note: All employees must undergo a medical evaluation, arranged by EHS Office (878-4038), and a respirator mask fit test (performed by EH&S) before being authorized to wear a respirator.*

VI. Task Assignments

In summary, maintenance of cooling tower water quality consists of the following ten (10) general tasks:

1. Start-up or return to service, including pre-start cleaning, biocide treatment, and efficacy testing - performed by Campus Services (HVAC and Plumbers) and Contracted Service Provider; (See Section X & XI)

2. Routine maintenance servicing, cleaning, chemical testing and treatment of each tower at least once every 7 days when in use - performed by Campus Services (HVAC and Plumbers); (Sections 7.1, 7.2, & 8.1)

3. Routine maintenance/treatment oversight and advisement of each tower in use at least once every 30 days - performed by Contracted Service Provider; (Section 8.1)

4. Prestart-up and 90-day inspections - performed by Contracted Service Provider (Section 8.2);

5. Routine sampling and testing of water used in each tower for microbiological activity (dip slide) at least once every 30 days while the tower is in use and at additional times as needed to validate process adjustments – performed by Contracted Service Provider (Section 9.1)

6. Sampling and testing of water used in each tower for Legionella within 14 days of seasonal start-up and at least once every 90 days thereafter while the tower is in use, and in response to emergencies or specified system or equipment malfunction incidents – performed by Contracted Service Provider (Section 9.2);

7. "System Decontamination" with higher levels of chlorine free residual and pH adjustment is performed when elevated levels of Legionella or microbials are detected and not abated by Routine Treatment or the system is idled (power or /equipment failure), loses biocide treatment or conductivity control or shutdown for more than 5 days – performed by Campus Services and Contracted Service Provider. (Section VII, VIII, IX, X, XI).

8. Resampling for chemical and microbial parameters immediately at required timeframes after changes are made to treatment regimen or decontamination is performed – performed by Campus Services and Contracted Service Provider and other vendors as necessary. (Sections VII, VIII, IX, X, XI)

9. Required follow-up or emergency sampling for Legionella in response to exceedance of action levels or in response to NYS DOH or Campus EH&S request – performed by Contracted Service Provider (Section 9.2).

10. Routine episodic (periodic, end of season), permanent, pre-start up, and shut down, cleaning, sanitizing, disinfection, and draining - performed by Campus Services (Section X and XI)

Sections VII through Section XI described the above general tasks and associated subtasks in greater detail.

VII. Chemical Testing and Routine Treatment

7.1 Water Testing for Chemical and Physical Parameters

Depending on which chemical is being used at the time, chlorine dioxide, bromine or chlorine (or other active ingredient as appropriate) free halogen residual level in the cooling system water will be measured at each service visit, as specified in Section VIII. Water conductivity, ORP, temperature and pH shall also be monitored and checked. Other parameters, such as hardness, shall be checked when deemed appropriate by the Contracted Service Provider. Chlorine dioxide and/or bromine will be used as the active ingredients for routine microbial (including Legionella) control during system operation and chlorine based cleaners will be used for sanitization and decontamination episodes.

Samples representative of the system water quality shall be obtained using properly cleaned and maintained equipment. Sampling and testing shall be performed and in accordance with procedures specified by the testing instructions supplied by the test (kit or instrument supplier) or in accordance with standardized published methods, such as "Standard Methods for the Examination of Water and Wastewater".

Colorimetric test methods, available from Chemetrics or Hach, will generally be used for measuring halogen (chlorine dioxide, bromine or chlorine) residual. For pH measurement, colorimetric measurement or hand held (or mounted) temperature compensated instruments may be used. ORP and conductivity measurements will be obtained with hand held or mounted conductivity controllers or meters such as a Myron L meter.

Equipment used for halogen residual, pH, conductivity, and any other tests (if necessary) shall be properly calibrated in accordance with the frequencies and procedures specified by the test equipment manufacturer or published test methods. The Contract Service Provider qualified professional shall evaluate the water treatment program whenever system changes are planned or occur to ensure analytical testing interferences (e.g. from contaminants or chemical constituents) have been identified and addressed to ensure accurate test results.

All information will be documented in a service or test reports presented to the Associate Facilities Program Coordinator and Environmental Programs Coordinator with records maintained in accordance with Section 3.4 and contained in Appendix D as appropriate.

A generalized summary of the chemical treatment and other measured parameter targets, actions, and related considerations for cooling tower water treatment are summarized in Table 7-1.

Table 7-1

Chemical Treatment Targets and Related Considerations

Routine Treatment Continuous (always preferred)

- Continuous free residuals within target concentrations (0.1 to 1.0 ppm as ClO_2 or 2.5 to 3.5 ppm as bromine) in the cooling towers hot returns. Ensure adequate distribution.
- Effectiveness decreases with increasing pH for some biocides; bromine is relatively more effective at pH 8.5-9.0.
- Stabilized halogen products should be added according to label instructions.
- Discharge of water or waste effluents to building sanitary sewers is preferrable. Discharge to storm sewers (via roof drains) will require removal of solids *and* deactivation of the active ingredient (debromination or dechlorination) without introducing other chemicals that detrimentally impact effluent water quality.
- Biodispersants may aid on efficacy of some biocide.
- May require periodic non-oxidizing products.

Intermittent use of Halogens

- Free halogen residual of 1.0 to 2.0 ppm as Cl_2 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 residual levels are adequate.
- Discharge of water or waste effluents to building sanitary sewers is preferrable. Discharge to storm sewers (via roof drains) will require removal of solids *and* deactivation of the active ingredient (debromination or dechlorination) without introducing other chemicals that detrimentally impact effluent water quality.
- Biodispersants may aid on efficacy of biocide.
- May require periodic nonoxidizing products.

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

- 5 ppm free halogen (bromine or chlorine) residual for at least one (1) hour
- Especially needed if HPC >100,000 CFU/ml or legionella >100 CFU/ml

7.2 Routine Treatment

Water Quality Objectives:

The goal of Routine Treatment is to maintain a biocide (halogen) free residual concentration in the water and conductivity below 1,500 ppm (as CaCO3).
For chlorine dioxide (ClO_2) treatment it is 0.1 ppm to 1.0 ppm. For other bioicides, with bromine or chlorine as the active ingredient, free halogen residual target range is 2.5 to 3.5 ppm (or mg/L).

Efficacy Verification, Triggers, and Follow-Up Actions:

Routine Treatment performance and efficacy shall be verified during monitoring, maintenance (weekly) visits, after adjustments are made to treatment or process control and inspections per Sections VIII, X, and XI).

When an off-normal condition exists (e.g. leaks, heavy biofouling, poor quality make-up water, periods of stagnation, etc.) or free halogen residual falls below the targeted range, the system must undergo adjustments to treatment and or decontamination depending on the circumstances, such as duration of the incident/issue. This is discussed further in Sections IX, X and Section XI and must be performed under advisement of the Contracted Service Provider qualified professional.

VIII. Maintenance Servicing and Formal Inspections

8.1 Routine Monitoring and Maintenance Service Visits

Note: All Campus Services and Contracted Service Provider employees who add biocides or perform cooling tower system disinfection shall also adhere to safety, licensing and other requirements described of Sections IV and V.

Weekly Service Visits:

At *least weekly,* routine monitoring, and servicing of all cooling towers will performed be during use by assigned, qualified Campus Services - HVAC and Plumbers or an accredited, qualified professional with cooling tower experience employed by the Contracted Service Provider (e.g. Feedwater Systems) as appropriate.

At least once every two (2) weeks, the readings and observations during the routine monitoring servicing visits shall be documented on the on the tower maintenance logsheet provided in Appendix D-5. The logsheet will be filled out by Campus Services at least once per month, while the Contracted Service Provider, as part of their monthly oversight visit (or Campus Services), will complete the logsheet (or vendor provides its own completed maintenance sheet) for visits during the other week as part of their monthly service visit. Service visits by Campus Services and Contracted Service Provider will be coordinated by the Associate Facilities Program Coordinator.

At a minimum, ***each weekly*** routine maintenance monitoring and service visit will include visual observations, checks, and (colorimetric or other) testing at each tower for:

1. Disinfectant (CLO_2, Br, or Cl as directed by Contracted Service Provider) residual concentration and conductivity;

2. Fill levels/charging of chemical dosing system;

3. Proper settings and operability of ORP, conductivity and other meters, level probes/float switches and other controllers (and ancillary equipment as appropriate);

4. Water sample for visual clarity/turbidity;

5. Observe general conditions (heavy fouling, sediment buildup, leaks).

Chemical residual tests will be performed for each tower in use. Treatment adjustments and/or other corrective actions will be initiated immediately upon discovery.

Level probes, floats switches, and controllers should be checked to ensure proper water levels are maintained. Adequate separation distance between the height of the make-up water valve/discharge outlets over the rim of overflow in the cooling tower (or evaporative condenser where applicable) cold water basin will be checked. The separation shall be at least twice the diameter (2 x D) of the supply pipe measured vertically above the top of the rim of the basin and in no case, shall the air gap be less than one (1) inch.

Within 10 Business Days of Start-Up:

Within business 10 days of seasonal start-up of any tower, the Contracted Service Provider (e.g. Feedwater Systems) shall perform a service visit to each cooling tower in use to sample and test tower water for Legionella and provide oversight monitoring, advisement and consultation. Legionella sampling and analysis shall be performed by the Contracted Service Provider within 10 days of start-up following maintenance of any year-round operated tower.

Monthly Service Visits:

At least once every 30 days while the tower is in use, the Contracted Service Provider (e.g. Feedwater Systems) shall perform a service visit to each cooling tower in use, sample and test for bacteriological cultures and provide oversight monitoring, advisement and consultation.

Quarterly Service Visits:

At least once every 90 days while the tower is in use, the Contracted Service Provider (e.g. Feedwater Systems) will perform a service visit to each cooling tower in use to sample test for Legionella, inspect and provide oversight monitoring, advisement and consultation.

8.2 Formal Inspections

Note: NYS requires that all towers be formally inspected prior to seasonal start-up and not less than once every ninety days during use.

In accordance with NYS DOH requirements:

A. Each cooling tower will be inspected prior to seasonal start-up (for year-round towers, prior to start-up following maintenance); and

B. Each towers shall also be inspected at intervals not exceeding every 90 days thereafter while in use.

Inspections will be performed by an appropriately accredited, qualified, professional, such as (but not limited to) a certified water technologist, with training and experience in current industry and standard protocols, including AHSRAE 188-2015, employed by the Contracted Service Provider (e.g. Feedwater Systems). Inspection of both externals and internals shall be performed.

At a minimum, inspections shall include an evaluation of:

1. Cooling tower and associated equipment for the presence of organic material, biofilm, algae, debris and other visible contaminants;

2. General condition of the cooling tower basin, remote sump, packing material, and drift eliminators;

3. Water make-up connections and cross contamination control, including backflow prevention and air gaps as needed;

4. Proper functioning of the conductivity control; and

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

6. Louver positioning, water leaks, missing or broken nozzles, spray nozzle positioning and fouling, build-up on drift eliminators, missing/damaged eliminators, fill air entrance and exit surfaces for fouling, dead legs/areas;

Any deficiencies shall be documented and reported by the Contracted Service Provider to the Associate Facilities Program Coordinator or his designee for immediate corrective action.

Copies of the Inspection Reports shall also be provided to, and maintained by the Environmental Health and Safety Office.

IX. Biological Testing and Response Actions

9.1 Routine Bacteriological Culture Sampling, Analysis and Response Actions

Note: NYS DOH requires bacteriological culture sampling to be performed at least once every 30 days while the cooling tower is in use and additional samples as needed to validate process adjustments.

In accordance with NYS DOH regulations, Buffalo State has set a deadline of at least once every 30 days for sample collection of water at each tower system for bacteriological cultures. Additional samples will be collected as needed to validate process adjustments.

Response actions will be carried out by the Contract Service Provider or Campus Services - HVAC and Plumbers, based on valid bacteriological culture (e.g. dip slide or HPC) test results of bulk water samples, as specified in Table 9-1:

1. *Bulk water sample dip slide is < 1,000 cfu/ml:* The efficacy of the treatment (biocide) regimen will be presumed adequate.

2. Bulk *water sample dip slide is ≥ 1,000 and < 100,000 cfu/ml:* Biocide treatment regimen and other process settings and water quality parameters, as necessary, will be ***immediately*** examined and adjusted to correct conditions and follow-up bacteriological cultures samples taken and analyzed to validate efficacy of the adjustments;

3. *Bulk water dip slide is ≥100,000 cfu/ml:* Biocide treatment regimen and other process settings and water quality parameters, as necessary, will be immediately examined and adjusted to correct conditions or, if recommended by Qualified Professional or Buffalo State College management, "System Decontamination" will be performed by Campus Services – HVAC. This will be followed by immediate confirmatory sampling and testing by the Contracted Service Provider to assess and assure efficacy.

Additional biological examination or testing, such as Legionella, biofilms/sessile counts, may be performed by and at the discretion of the Contracted Service Provider qualified professional based on tower observations or inspection findings per Sections 8.1 through 8.2. A summary of water quality objectives for the various types of biological tests/exams are provided in Table 9-2.

Test results reports for biological parameters shall be promptly provided to EH&S in order to fulfill the college's regulatory reporting obligations to NYS DOH.

Table 9-1

Required Response Actions for Routine Bacteriological Culture Test Results

Microbial (dip slide or HPC) Test Result	Required Response Actions
< 1,000 cfu/ml, perform the following:	1. Maintain Routine Treatment and monitoring;
≥ 1,000 cfu/ml but < 100,000 cfu/ml, perform the following:	1. Review treatment program/equipment & check for off-normal conditions (e.g. leaks, heavy biofouling, poor quality make-up water, periods of stagnation, etc.); 2. Repair or adjust instrumentation & settings if issues found; 3. Follow-up bacteriological culture sampling and analysis by Contracted Service Provider to validate process adjustments.
≥ 100,000 cfu/ml, perform the following:	Perform either: 1.A. Immediately review, investigate, and adjust biocide treatment program and settings; or 1.B. Immediately isolate system and carry out "System Decontamination" procedure as specified in Section 10.3; and 2. Resample and test for bacteriological cultures by Contracted Service Provider within 3 to 7 days until consecutive readings show improvement and/or repeat "System Decontamination" as needed per advisement of Contracted Service Provider qualified professional.

Table 9-2

Recommended Biological Parameter Targets for Routine Treatment of Cooling Water Systems (from Cooling Technology Institute, WTB-148 CTI WTB-148(08))

Parameter	Dipslides	Agar Pour Plate or Petri Film	Microscopic Examination
Plank tonic	<10,000	<10,000 CFU/ml	No higher life forms
Sessile Counts	<100,000	<100,000 CFU/cm^2	No higher life forms
Deposits	NA	NA	No higher life forms

9.2 Legionella Sample Collection, Analysis, and Response Actions

Sampling Schedule for Legionella:

Note: NYS DOH regulations require routine sampling and analysis for Legionella within 2 weeks of seasonal start-up and at intervals not exceeding 90 days thereafter. DOH

regulations also require sampling and analysis for Legionella when any of the following incidents occur:

(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 or any other control methods to maintain proper cycles of concentration;
(iv) determination by the health department 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 health department.

In accordance with NYS DOH regulations, Buffalo State has set the following deadlines for sample collection at each applicable tower system for Legionella analysis to ensure the DOH timeline requirements are met:

1. Within 10 business days of seasonal start-up ***and*** at intervals not exceeding 90 days thereafter;

2. Whenever there is power failure or loss of biocide treatment (e.g. due to power disruptions, outages or malfunctioning equipment) for periods more than five (5) consecutive days, when the tower is normally in use. This period may be reduced to less than 5 days at the discretion of the qualified professional with the Contracted Service Provider;

3. Whenever there loss of conductivity control or other methods to maintain proper cycles of concentration for more than five (5) consecutive days when the tower is normally in use. This period may be reduced to less than 5 days at the discretion of the qualified professional with the Contracted Service Provider;

4. Whenever sample test results show Legionella exceed the action levels specified in Table 9-3, additional follow-up samples shall be collected at intervals specified in Table 9-3.

5. When requested by the NYS DOH, Erie County DOH, qualified professional employed by the Contracted Service Provider or the EH&S Director.

Note: All campus cooling towers are operated seasonally. Sampling triggers due to treatment and associated equipment downtimes, malfunctions, interruptions are based on periods when the tower is normally operated and are not applicable when seasonally off-line and in a "mothballed" (drained and cleaned) condition.

Campus Services or Contract Service Provider shall notify EH&S at ext. 4038 immediately upon discovery of system incidents or failures described in items 2 or 3 above. Sample collection will be coordinated with the Contracted Service Provider, EH&S and other vendors as necessary. Samples will be collected in a manner that is representative of the water potentially aerosolized by the tower.

Results will be evaluated upon receipt and corrective actions will be immediately implemented in accordance with Table 9-3. *Note: This is same as Appendix 4-A in the NYS DOH regulations.*

Notification to the Health Department:

Any valid Legionella result exceeding 1,000 cfu/ml shall be reported to the Erie County DOH within 24 hours. It is incumbent upon the Contract Service Provider to provide these results to the Campus Services - Associate Facilities Program Coordinator (716-878-3143, 716-983-4272 (cell) and EH&S Coordinator (716-878-6136, 716 341-7240 (cell)) in a prompt and timely manner to ensure these time frames are met.

Laboratory Accreditation and Analytical Records:

All samples collected for Legionella analysis will be analyzed by an accredited laboratory that holds both New York State ELAP certification.

All records of these analyses will be maintained in the EH&S Office.

Table 9-3
Required Response Actions for Legionella Test Results

Legionella Test Result cfu/mL	Required Response Actions
No detection (< 20 cfu/mL),	1. Maintain routine treatment and routine Legionella monitoring per this plan;
≥ 20 cfu//ml but < 1,000 cfu/ml,	1. Immediately review treatment program (under advisement of Contracted Service Provider qualified professional); 2. Institute "On-Line Disinfection" to help with control; 3. Retest water for Legionella within 3 to 7 days A. Continue to retest at the same time interval (3 - 7 days) until one sample retest result is < 20 cfu/mL. With receipt of result < 20 cfu/mL, resume routine maintenance program and plan. B. If retest is > 20 cfu/mL but < 100 cfu/mL repeat "On-Line Disinfection" and retest until < 20 cfu/mL attained. C. If retest is ≥ 100 cfu/mL but < 1,000 cfu/mL further investigate water treatment program and IMMEDIATELY perform "On-Line Disinfection." Retest and repeat attempts at control strategy until < 20 cfu/mL obtained. D. If Legionella ≥ 1,000 cfu/mL, see actions listed below.
≥ 1,000 cfu/ml, :	1. Immediately review and investigate treatment program and provide appropriate

	notifications to health department within 24 hours of receipt of report and public per DOH instruction; 2. Immediately institute "On-Line Decontamination" to help with control; 3. Retest water in 3 to 7 days: A. Continue to retest at same time interval until one sample result is < 20 cfu/mL. With receipt of result < 20 cfu/mL, resume routine maintenance (treatment and monitoring program); B. If any test result is > 20 cfu/mL but < 100 cfu/mL, repeat "On-Line Disinfection" And retest for legionella until < 20 cfu/mL attained; C. If any retest is > 100 cfu/mL but < 1,000 cfu/mL, further investigate water treatment program and IMMEDIATELY perform "On-Line Disinfection". Retest for legionella and repeat attempts at this control strategy until < 20 cfu/mL attained. D. If ANY retest is ≥ 1,000 cfu/mL, carry out "System Decontamination."

Definitions for Response Actions Listed in Table 9-3:

"Online Decontamination" as specified by DOH regulations, means dose the recirculation water with a halogen-based compound (Cl or Br) equivalent to at least 5 mg/L (ppm) free residual halogen for at least one (1) hour.

"Online Disinfection" as specified by DOH regulations, means dose the cooling tower water system with either a different biocide or a similar biocide at an free residual increased concentration than currently used.

"System Decontamination" as specified by DOH regulations, means completing all of the following steps: 1. Maintain between 5 to 10 mg/L (ppm) free residual halogen (ex. Chlorine) for a minimum of one hour; 2. Drain and flush with disinfected water; 3. Clean wetted surface; 4. Refill and dose to 1 – 5 mg/L (ppm) of free residual halogen and circulate for 30 minutes; and 5. (Drain and) refill, re-establish treatment and retest for verification of treatment. For chlorine treatment, the pH range should be 7.0 to 7.6. For bromine treatment, the pH range 7.0 to 8.7. At higher pH values the treatment times may need to be extended.

X. Flushing, Cleaning, Disinfection and Decontamination Plan

10.1 Triggers for System Decontamination, Cleaning, and Disinfection

"Cleaning and Disinfection" of a tower system shall be performed:

1. Prior to startup of stagnant cooling tower that has been without treatment and recirculation for more than five (5) consecutive days;

2. Whenever a tower is scheduled for end-of-season shutdown discontinued use or removal.

The procedure for performing end of season decontamination is the same as Steps 1 through 11 of the "System Decontamination" provided in Section 10.3. The "End-of-Season Decontamination and Disinfection Logsheet" for performing end-of-season cleaning of each tower must be completed an is provided in Appendix D-2 and D-3 (for the ice rink condenser).

10.2 Flushing of Idled Systems

Whenever a tower is idled (stagnation, no treatment and recirculation) more than one (1) day but no more than five (5) consecutive days, at a minimum the tower piping, basin, sump and wetted surfaces will be flushed and drained in accordance with instructions provided by the qualified professional employed by the Contracted Service Provider. Flushing and draining will be performed as automated or manually.

Additional chemical treatment may also be performed if advised by the qualified professional employed by the Contracted Service Provider.

10.3 System Decontamination Procedure

Note: All Campus Services and Contracted Service Provider employees performing disinfection with biocides shall also adhere to safety, licensing and other requirements described of Sections IV and V.

"System Decontamination" shall be carried out by qualified Campus Services - HVAC and Plumbers or a contracted vendor under the direction of the Campus Services-Associate Facilities Program Coordinator and advisement by the Contracted Services Provider qualified professional.

The following steps shall be carried out and documented along with date and time of each step completion in the "Emergency Decontamination, Cleaning and Disinfection Logsheet" provided in Appendix D-4 with no exceptions:

1. Notify EH&S (ext. 4038 or ext. 6136) within 24 hours that decontamination is about to be performed;

2. Isolate system - shut off heat load, shut of cooling fans and blowdown, close building air intake vents in vicinity of cooling tower;

3. Continue to operate recirculating pumps;

4. Add biocide to maintain 5 to 10 mg/L free residual chlorine through system for *at least* one (1) hour;

5. Add bio-dispersant or anti-foaming agent if needed;
6. Monitor system pH as halogen disinfection slows at higher pH. Adjust pH with acid and/or cycles as necessary to achieve and maintain pH between 7.0 and 7.6 S.U. using chlorine or between 7.0 and 8.7 S.U. if using bromine. At higher pH values the treatment times may need to be extended at the recommendation of the qualified professional;

7. De-halogenate then immediately drain entire system;

8. Flush with clean (disinfected) water;

9. Clean all wetted surfaces in accordance as follows:

    A. Visible accumulations of debris, such as leaves, sludge, or dirt in the basin and/or other objectionable conditions shall be removed and any other appropriate corrective action will be commenced immediately to place the system into a safe condition by Campus – HVAC and Plumbers or contracted vendor under the direction of the Campus Services Associate Facilities Program Coordinator and advisement by the Contracted Service Provider qualified professional;

    B. Attention to stagnant or dead leg areas of piping shall be considered and addressed to ensure adequate cleaning and disinfection; and

    C. When no biofilm is obvious, tower fill, supports, cell partitions, and sump shall be mechanically cleaned.

10. Drain entire system;

11. Refill with water dosed to 1 to 5 mg/L (ppm) of free residual with pH maintained between 7.0 and 7.6 S.U. and circulate through tower/condenser system for 30 minutes;

12. De-halogenate then immediately drain entire system;

13. Refill system and re-establish treatment and retest (for targeted halogen or other biocide as appropriate) free residual to verify proper treatment.

XI. System Shutdown and Start-Up Plan

Start up and shutdown procedures are necessary and shall be followed to manage potentially hazardous conditions associated with operation of fans (and mist) during periods when the tower water is untreated.

11.1 Start-Up for Drained Systems (e.g. Seasonal Start-Up)

Note: All Campus Services and Contracted Service Provider employees performing cooling tower system biocidal treatments shall also adhere to safety, licensing and other requirements described of Sections IV and V.

Note: If the tower is idled, loses its biocide treatment or shutdown for more than 5 days, the system decontamination procedure identified in Section X shall be followed.

All towers will be sanitized (disinfected) and inspected by a Qualified Professional prior to initial or seasonal start-up. Prior to operating the cooling tower, the following shall be performed and documented on the Pre-Start-Up Sanitization Logsheet provided in Appendix D-1:

1. Contact Contracted Service Provided Qualified Professional (e.g. Feedwater Systems) to arrange for pre-start-up inspection;

2. Clean all debris, such as leaves and dirt from the cooling tower;

3. Fill system with clean water;

4. Operate the pumps, DO NOT OPERATE the fans;

5. Maintain the maximum recommended biocide free residual for the specific biocide (typically it will be CLO2 between 0.8 and 1.0 ppm) for a sufficient period of time (residual and time will vary with biocide) to bring the system under good biological control or, execute an alternate pretreatment (sanitization) method specifically recommended by Contracted Service Provider qualified professional;

6. Once the sanitization in step 4 is successfully completed, fill out the logsheet (Appendix D);

7. The fan can be turned on and the system returned to service. Resume the standard maintenance, inspection and Routine Water Treatment program per Sections 7.1, 7.2, 8.1, and 8.2.

11.2 Start-Up for Short Duration Stagnant Systems (a.k.a. "Stagnant Restart")

Note: All Campus Services and Contracted Service Provider employees performing cooling tower system biocidal treatments shall also adhere to safety, licensing and other requirements described in Sections IV and V.

This procedure in this section applies only to start-up of a stagnant system that is idled (e.g. power/equipment failure), loses its biocide treatment, or shutdown for short durations of three (3) days or less.

Prior to operating the cooling tower, the following shall be performed:

1. Remove accessible solid debris from the cooling tower sump and from any remote storage tank(s) that may be used;

2. Perform the biocide pretreatment procedures described in Section 11.1 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;***

3. 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;

4. After biocidal pretreatment has been successfully completed, circulate the cooling water over the tower fill with fans off; and

5. When biocide residual is maintained at a satisfactory level for at least 6 hours, the cooling tower fans may be operated.

11.3 Discontinued Use for Seasonal Towers and Permanent Shutdown

Cooling towers that will discontinue operation (end-of-season or permanently) or be physically removed shall be decontaminated, flushed, and drained as described in Section 10.1 and also steps 1 through 11 in 10.3. The "End-of-Season Decontamination and Disinfection Logsheet" for performing end-of-season or permanent shutdown cleaning of each tower must be completed an is provided in Appendix D-2 and D-3 (for the ice rink condenser).

The Environmental Programs Coordinator 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.

XII. Annual Certification

Each year, the Contracted Service Provider qualified professional will provide written certification to the Environmental Programs Coordinator 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 this maintenance program and plan has been developed and implemented.

The Environmental Programs Coordinator shall provide this certification to the NYS DOH and maintain a copy of this certification on file for inspection per Section 3.5.

XIII. Regulatory Reporting Triggers and Deadlines

A list of actions and associated deadlines required by the associated NYS DOH and DEC regulations are provided in Table 14-1. All but the DEC pesticide report must be electronically inputted into the DOH statewide electronic system (unless otherwise directed by DOH). Input of information into the electronic system will be performed by the Environmental Health and Safety Office.

Table 13-1
Regulatory Reporting Triggers for Cooling Towers
(all actions DOH unless otherwise indicated)

Action	Reporting Deadline*
Notification to local health department, (961-6800 or 961-7898 (after hours). for any legionella test result exceeding 1,000 cfu/ml.	Within 24 hours of receipt of results.
Notification to public for any legionella test result exceeding 1,000 cfu/ml.	To be determined via 24-hour notification to local health dep't
Registration of New Cooling Towers	Prior to Operation
Date and result of last bacteriological culture sample collection and any required remedial action	Within 90 days while the tower is in use
Date and result of last Legionella culture sample collection and any required remedial action Legionella sample collection, sample results, and date of any required remedial action;	Within 90 days while the tower is in use
Date of Last Inspection	Within 90 days
Date of Last Annual Certification (due by Nov. 1st each year)	Within 90 days
Date of Removal or Permanent Discontinued Use of a Tower	Within 90 days
Annual Pesticide Report (to DEC)	February 1st each year

Buffalo State
State University of New York

APPENDIX A
Plan History Log

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Appendix A- Plan History Log

Track all significant changes to the plan.

Date	*Initials*	*Revision Number*	*Summary of Changes*
08/23/2016	*JPB*	*1*	*Modified Plan to address changes contained in July 6, 2016 DOH Final Rule*
04/24/2017	*JPB*	*2*	*Updated information for Twin Rise tower to reflect old tower decommissioning, new tower installed in 1/17, schedule for commissioning later in 2017, & elimination of certain chemicals used at old Twin Rise tower only.*

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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 publication of a Notice of Adoption in the State Register, to read as follows:

PART 4: Protection Against *Legionella*

SUBPART 4-1 Cooling Towers

§ 4-1.1 Scope.

All owners of cooling towers shall comply with this Subpart.

§ 4-1.2 Definitions.

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

(a) *Bacteriologic culture sampling and analysis.* The term *bacteriologic culture sampling and analysis* means the collection of a water sample for the measurement of live culture growth of the aerobic bacterial populations by heterotrophic plate count (HPC), dip slides, or similar method used by the industry and according to the manufacturer's directions.

(b) *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.

(c) *Cooling Tower.* The term *cooling tower* means a cooling tower, evaporative condenser, fluid cooler or other wet cooling device that is capable of aerosolizing water, and that is part of, or contains, a recirculated water system and is incorporated into a building's cooling process, an industrial process, a refrigeration system, or an energy production system.

(d) *Legionella culture sampling and analysis.* The term *Legionella culture sampling and analysis* means the collection of a water sample for the measurement of the live culture of *Legionella* involving the use of specialized media and laboratory methods for growth to determine the species and serogroup.

(e) *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, a cooling tower or the premises where the cooling tower is located. In all instances, the legal owner of the building shall be deemed an owner within the meaning of the Subpart. Further, where a tenant owns a cooling tower that services the tenant's leased premises, the tenant is an "owner" within the meaning of this Subpart. Additionally, if a tenant does not own the cooling tower but has a lease or contractual arrangement to maintain the cooling tower, the tenant shall be deemed an agent having control of the cooling tower, and thus an "owner," for purposes of this Subpart.

§ 4-1.3 Electronic registration and reporting.

(a) *Registration.* All owners of cooling towers shall register such towers with the department, using a statewide electronic system designated by the department, prior to initial operation, and whenever any owner of the cooling tower changes. Such registration shall include, at a minimum, the following information:

(1) street address of the building at which the cooling tower is located, with building identification number, if any;

(2) name(s), addresses(es), telephone number(s), and email address(es) of the owner(s) of the cooling tower;

(3) name of the manufacturer of the cooling tower;

(4) model number of the cooling tower;

(5) specific unit serial number of the cooling tower, if available;

(6) cooling capacity of the cooling tower;

(7) cooling tower system volume, inclusive of all piping, basin(s), and sump;

(8) intended use of the cooling tower;

(9) whether the cooling tower operates year-round or seasonally and, if seasonally, start and end date of operation;

(10) whether systematic disinfection in accordance with section 4-1.7 of this Subpart is maintained manually, through timed injection, or through continuous delivery;

(11) whether maintenance is performed by in-house personnel, by a contractor, or by other parties; and

(12) year the cooling tower was placed into service.

(b) *Reporting.* Effective upon adoption of the regulation, at intervals of no more than 90 days while a cooling tower is in use, the owner of the cooling tower shall report to the department using the statewide electronic system:

(1) date of last bacteriological culture sample collection, the analysis result(s), and date of any required remedial action, pursuant to section 4-1.4(b)(1) of this Subpart;

(2) date of last *Legionella* culture sample collection, the analysis result(s), and date of any required remedial action, pursuant to section 4-1.4(b)(2) - (4) of this Subpart;

(3) date of last inspection, pursuant to section 4-1.8 of this Subpart;

(4) date of last certification, pursuant to section 4-1.8 of this Subpart;

(5) date of removal or permanent discontinued use of the cooling tower, if applicable; and

(6) such other information as shall be determined by the department.

(c) The department shall make data in the statewide electronic system publicly available, as appropriate. The statewide electronic system shall be made fully accessible and searchable to any local health department. Nothing in this Subpart 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.

(d) Where both a landlord and a tenant are considered "owners" of a cooling tower pursuant to Section 4-1.2 of this Subpart, either the owner or the tenant shall register the cooling tower. However, both parties are obligated to ensure that registration and reporting are completed as required by this Subpart.

§ 4-1.4 Maintenance program and plan.

(a) By September 1, 2016, and thereafter prior to initial start-up of a newly installed cooling tower, the owner shall obtain or update a maintenance program and plan for each cooling tower, 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 maintenance program and plan shall include the following elements:

(1) a schedule for routine bacteriological culture sampling and analysis to assess microbiological activity at intervals not to exceed 30 days while the cooling tower is in use, and that requires additional bacteriological culture sampling and analysis, as needed, to validate process adjustments;

(2) a schedule for routine *Legionella* culture sampling and analysis within 14 days of seasonal start-up and, thereafter, at intervals not to exceed 90 days while the cooling tower is in use. Cooling towers in use year-round must sample at intervals not to exceed 90 days, and within two weeks after start-up following maintenance;

(3) in addition to the routine *Legionella* culture sampling and analysis required by paragraph (2) of this subdivision, conditions that require immediate *Legionella* culture sampling and analysis, which shall include, but are not limited to:

(i) power failure of sufficient duration to allow for the growth of bacteria;

(ii) loss of biocide treatment of sufficient duration to allow for the growth of bacteria;

(iii) failure of conductivity control, or any other control methods, to maintain proper cycles of concentration;

(iv) a determination by the department or local health department 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 department or local health department.

(4) provisions requiring immediate and appropriate action, including remedial action, in response to bacteriological and *Legionella* culture analyses. For *Legionella* culture analyses, such provisions shall include, but not be limited to, taking all responsive actions

required by Appendix 4-A, including contacting the local health department within 24 hours pursuant to the conditions specified in section 4-1.6 of this Subpart;

(5) provisions requiring that any and all *Legionella* culture analyses must be performed in accordance with section 4-1.5 of this Subpart;

(6) a shutdown and disinfection plan for removing or permanently discontinuing use of a cooling tower;

(7) provisions requiring treatment and manual or automated flushing of any piping, basin, sump, or wetted surface during idle conditions; and

(8) provisions requiring cleaning and disinfection prior to startup of a stagnant cooling tower that has been shut down without treatment and recirculation for more than five consecutive days.

§ 4-1.5 *Legionella* culture analysis.

All *Legionella* culture analyses must be performed by a laboratory that is approved to perform such analysis by the New York State Environmental Laboratory Approval Program (ELAP).

§ 4-1.6 Notification.

(a) The owner of a cooling tower shall notify the local health department within 24 hours of receipt of a *Legionella* culture sample result that exceeds 1,000 colony forming units per milliliter (CFU/mL). The local health department shall notify the state department of health with 24 hours of receipt of such a report.

(b) The owner shall notify the public of such test results in a manner determined by the local health department or, in the event that the department elects to determine the manner of public

notification, by the department.

§ 4-1.7 Disinfection.

(a) Any person who disinfects a cooling tower 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.

(b) The name and certification number of the applicator or the business name and registration number of the company providing the disinfection shall be maintained on-site in accordance with section 4-1.9 of this subpart.

(c) Only biocide products registered by the New York State Department of Environmental Conservation for use in cooling towers or pesticidal devices produced in a USEPA registered establishment may be used in disinfection.

(d) The terms "disinfect" and "disinfection" in this Part means the control of microorganisms or microbial growth. The term "disinfection" shall not include the cleaning of a cooling tower through application of detergents, penetrants, brushes or other tools, high-powered water, or any other method that does not involve the use of a pesticide, as defined in 6 NYCRR Part 325.

§ 4-1.8 Inspection and certification.

(a) Inspection.

(1) All owners of cooling towers shall ensure that such towers are inspected prior to seasonal start-up and at intervals not exceeding every 90 days while in use. Year-round towers shall be inspected at intervals not exceeding every 90 days and prior

to start-up, following maintenance.

(2) All inspections shall be performed by a: New York State licensed professional engineer; certified industrial hygienist; certified water technologist; environmental consultant or water treatment professional 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 4-1.4 of this Subpart.

(3) Each inspection shall include an evaluation of the:

(i) cooling tower and associated equipment for the presence of organic material, biofilm, algae, debris and other visible contaminants;

(ii) general condition of the cooling tower basin, remote sump, packing material, and drift eliminators;

(iii) water make-up connections and control, including backflow protection and/or airgaps as needed;

(iv) proper functioning of the conductivity control; and

(v) proper functioning of all water treatment equipment, including, but not limited to, pumps, timers, valves, and strain gauges.

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

(b) *Certification.* By November 1, 2016, and by November 1st of each year thereafter, the owner of a cooling tower shall obtain a certification from a person identified in subdivision (a) of this

section, that such cooling tower has a maintenance program and plan, and that all activities within that plan or required by this Subpart were implemented, including but not limited to:

(1) all bacteriological culture sampling and analysis;

(2) all *Legionella* culture sampling and analysis, including any immediate *Legionella* culture sampling and analysis performed pursuant to paragraphs (b)(3) and (b)(4) of section 4-1.4 of this Subpart;

(3) any disinfection performed pursuant to section 4-1.7 of this Subpart; and

(4) all inspections performed pursuant subdivision (a) of this section.

(c) *Reporting.* All inspection findings, deficiencies, and corrective actions, and all certifications, shall be reported to the owner, who shall retain such information, in accordance with section 4-1.9 of this Subpart.

§ 4-1.9 Recordkeeping.

The owner of a cooling tower shall maintain records for at least three years of all sampling and analyses; disinfection schedules and applications; inspection findings, deficiencies, and corrective actions; and certifications. An owner shall maintain a copy of the maintenance program and plan required by this Subpart on the 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.

§ 4-1.10 Enforcement.

(a) The department or local health department may require any owner to conduct *Legionella* culture sampling and analysis, following a determination, based upon epidemiologic data or

laboratory testing, that one or more cases of legionellosis are or may be associated with a cooling tower.

(b) An officer or employee of the department or local health department may enter onto any property to inspect a cooling tower for compliance with the requirements of this Subpart, in accordance with applicable law, and may take water samples as part of such inspections.

(c) Where an owner does not register, have a maintenance program and plan, obtain certification, disinfect, perform or obtain culture sampling and analysis, or inspect a cooling tower within the time and manner set forth in this Subpart, 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.

(d) A violation of any provision of this Subpart 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 Subpart shall constitute a separate and distinct violation of each such provision.

§ 4-1.11 Variances and waivers.

(a) Variances. In order to allow time for compliance with this Subpart, an owner may submit a written application to a local health department for a variance from any provision of this Subpart, for a period not exceeding 90 days, accompanied by an explanation of why such variance will not present a danger to public health. With the approval of the department, the local health department may approve such application for a variance in writing, subject to any conditions that the department or local health department may deem appropriate to protect public health. The local health department or department may revoke such variance upon a determination that the

variance may present a danger to public health.

(b) Waivers. The department may issue a written general or specific waiver with respect to any provision of this Subpart, subject to any conditions the department may deem appropriate, where the department is satisfied that such waiver will not present a danger to public health. The department may revoke such waiver upon a determination that the waiver may present a danger to public health.

§ 4-1.12 Severability.

If any provisions of this Subpart 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 Subpart 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/mL[1]	Response
No detection (< 20 CFU/mL)	Maintain treatment program and *Legionella* monitoring in accordance with the maintenance program and plan.
For levels at ≥ 20 CFU/mL but < 1000 CFU/mL perform the following:	o Review treatment program. o Institute immediate *online disinfection*[2] to help with control o Retest the water in 3 – 7 days. ▪ Continue to retest at the same time interval until one sample retest result is < 20 CFU/mL. With receipt of result < 20 CFU/mL, resume routine maintenance program and plan. ▪ If retest is ≥ 20 CFU/mL but < 100 CFU/mL, repeat *online disinfection*[2] and retest until < 20 CFU/mL attained. ▪ If retest is ≥100 CFU/mL but < 1000 CFU/mL, further investigate the water treatment program and immediately perform *online disinfection*. [2] Retest and repeat attempts at control strategy until < 20 CFU/mL attained. o If retest is ≥ 1000 CFU/mL, undertake control strategy as noted below.

For levels ≥ 1000 CFU/mL perfonn the following:	o Review the treatment program and provide appropriate notifications per section 4-1.6 of this Subpart. o Institute immediate *online decontamination*[3] to help with control o Retest the water in 3 – 7 days: ▪ Continue to retest at the same time interval until one sample retest result is < 20 CFU/mL. With receipt of result < 20 CFU/mL, resume routine maintenance program and plan. ▪ If any retest is ≥ 20 CFU/mL but < 100 CFU/mL, repeat *online disinfection*[2] and retest until < 20 CFU/mL attained. ▪ If any retest is ≥ 100 CFU/mL but < 1000 CFU/mL, further investigate the water treatment program and immediately perform *online disinfection*.[2] Re-test and repeat attempts at control strategy until < 20 CFU/mL attained. ▪ If any retest is ≥ 1000 CFU/mL: • carry out *system decontamination*[4].

[1] Colony forming units per milliliter.

[2] 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.

[3] Online decontamination means – Dose the recirculation water with a halogen-based compound (chlorine or bromine) equivalent to at least 5 milligrams per liter (mg/L) or parts per

million (ppm) free residual halogen for at least one hour.

[4] System decontamination means – Maintain between 5 to 10 mg/L (ppm) free residual halogen 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 halogen and circulate for 30 minutes. Refill, re-establish treatment and retest for verification of treatment.

For chlorine treatment the pH range should be 7.0 to 7.6; for bromine treatment the pH range should be 7.0 to 8.7. At higher pH values the treatment times may need to be extended.

NOTE: Stabilized halogen products should not be used for online decontamination or system decontamination as defined in this Appendix per footnotes 3 and 4.

SUBPART 4-2 Health Care Facilities

§ 4-2.1 Scope.

All general hospitals and residential health care facilities as defined in Article 28 of the Public Health Law (collectively, "covered facilities") shall comply with this Subpart.

§ 4-2.2 Definitions.

(a) *Covered facilities*. The term *covered facilities* means all general hospitals and residential health care facilities as defined in Article 28 of the Public Health Law.

APPENDIX C
List of Registered Cooling Towers and Specifications

APPENDIX C

Buffalo State College Cooling Tower Inventory - 2017

Location	Type	Mfr	Model#	Serial#	Cooling Capacity (tonnage)	Basin Capacity (gal)	Water Recirculation Rate (gpm)
BP Art Center	Cooling Tower	BAC	15146	U070228701	140	450	420
BP Art Center	Cooling Tower	BAC	15146	U070228702	140	450	420
Butler Library	Cooling Tower	BAC	15201	U013127501	200	500	600
Butler Library	Cooling Tower	BAC	15201	U013127502	200	500	600
Caudell Hall	Cooling Tower	Evapco	UT-19-48	14-692142	159	405	452
Classroom Bldg	Cooling Tower	BAC	15146-2	U013129901	275	475	825
Classroom Bldg	Cooling Tower	BAC	15146-2	U013129902	275	475	825
Bulger Comm.	Cooling Tower	Evapco	LRT-8-124	T011283	275	641	1050
Cleveland Hall	Cooling Tower	BAC	VTL 272-OM	U013128901	200	572	750
Houston Gym	Cooling Tower	BAC	PT2-0809A-3K2	U135001103-01-01	400	335	1200
Houston Gym	Cooling Tower	BAC	PT2-0809A-3K2	U135001103-01-02	400	335	1200
Ice Rink	Evaporative Condenser	BAC	VC1-150	U041158701	147	139	2205
SAMC	Cooling Tower	Evapco	AT-112-618	9-375375	705	1391	2100
SAMC	Cooling Tower	Evapco	AT-112-618	9-375374	705	1391	2100
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377774	117	460	350
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377773	117	460	350
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377772	117	460	350
Student Union	Cooling tower	BAC	VTL-171	U040438201	200	432	600
Student Union	Cooling Tower	BAC	VTL-171	U040438204	200	432	600
Tech. Bldg.	Cooling Towr	Evapco	LPT-529	12-472959	114	294	383
Tech. Bldg	Cooling Tower	Evapco	LPT-529	12-472960	114	294	383
Twin Rise	Cooling Tower	BAC	VTO-065-J/X	U162722201-01-01	75	85	225

Buffalo State
State University of New York

APPENDIX D
Maintenance Service and Decontamination Logsheets (maintained at Campus Services operations offices 878-6111 or 878-3143)

Appendix D Notes:

* Completed tower maintenance service logsheets are maintained and available by contacting the Campus Services Associate Facilities Program Coordinator at 878-3143 or 878-4111;

* Completed emergency disinfection, decontamination and cleaning logsheets are maintained and available by contacting the Environmental Health and Safety Office at 878-4038

APPENDIX D-1

Start-Up Sanitization Logsheet Cooling Tower - Buffalo State College

Location	Type	Mfr	Model#	Serial#	Cleanout Debris and Sanitize with Biocide (CLO_2 at 0.8 to 1 ppm) for Sufficient Period of Time (Place your initials here when completed)	Indicate Date Sanitization Completed and Tower Started-Up
BP Art Center	Cooling Tower	BAC	15146	U070228701		
BP Art Center	Cooling Tower	BAC	15146	U070228702		
Butler Library	Cooling Tower	BAC	15201	U013127501		
Butler Library	Cooling Tower	BAC	15201	U013127502		
Caudell Hall	Cooling Tower	Evapco	UT-19-48	14-692142		
Classroom Bldg	Cooling Tower	BAC	15146-2	U013129901		
Classroom Bldg	Cooling Tower	BAC	15146-2	U013129902		
Bulger Comm.	Cooling Tower	Evapco	LRT-8-124	T011283		
Cleveland Hall	Cooling Tower	BAC	VTL 272-OM	U013128901		
Houston Gym	Cooling Tower	BAC	PT2-0809A-3K2	U135001103-01-01		
Houston Gym	Cooling Tower	BAC	PT2-0809A-3K2	U135001103-01-02		
Ice Rink	Evaporative Condenser	BAC	VC1-150	U041158701		
SAMC	Cooling Tower	Evapco	AT-112-618	9-375375		
SAMC	Cooling Tower	Evapco	AT-112-618	9-375374		
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377774		
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377773		
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377772		
Student Union	Cooling Tower	BAC	VTL-171	U040438201		
Student Union	Cooling Tower	BAC	VTL-171	U040438204		
Tech. Bldg.	Cooling Tower	Evapco	LPT-529	12-472959		
Tech. Bldg	Cooling Tower	Evapco	LPT-529	12-472960		
Twin Rise	Cooling Tower	BAC	VTO-065-J/X	U162722201-01-01		

Distribution: Bleech, Eckert, FTS (Wilson)

APPENDIX D-2

End-of-Season Decon. Checklist for Cooling Towers - Buffalo State College

Location	Type	Mfr	Model#	Serial#	Indicate Date end-of Season Decontamination Was Completed	Your Initials
BP Art Center	Cooling Tower	BAC	15146	U070228701		
BP Art Center	Cooling Tower	BAC	15146	U070228702		
Butler Library	Cooling Tower	BAC	15201	U013127501		
Butler Library	Cooling Tower	BAC	15201	U013127502		
Caudell Hall	Cooling Tower	Evapco	UT-19-48	14-692142		
Classroom Bldg	Cooling Tower	BAC	15146-2	U013129901		
Classroom Bldg	Cooling Tower	BAC	15146-2	U013129902		
Bulger Comm.	Cooling Tower	Evapco	LRT-8-124	T011283		
Cleveland Hall	Cooling Tower	BAC	VTL 272-OM	U013128901		
Houston Gym	Cooling Tower	BAC	PT2-0809A-3K2	U135001103-01-01		
Houston Gym	Cooling Tower	BAC	PT2-0809A-3K2	U135001103-01-02		
SAMC	Cooling Tower	Evapco	AT-112-618	9-375375		
SAMC	Cooling Tower	Evapco	AT-112-618	9-375374		
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377774		
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377773		
STAC	Cooling Tower	Evapco	LRW-68-3-1	10-377772		
Student Union	Cooling Tower	BAC	VTL-171	U040438201		
Student Union	Cooling Tower	BAC	VTL-171	U040438204		
Tech. Bldg.	Cooling Tower	Evapco	LPT-529	12-472959		
Tech. Bldg	Cooling Tower	Evapco	LPT-529	12-472960		
Twin Rise	Cooling Tower	BAC	VTO-065-J/X	U162722201-01-01		

Distribution: Bleech, Eckert

APPENDIX D-2

End-of-Season System Decontamination, Cleaning, and Disinfection Logsheet for Cooling Towers
– Buffalo State College-

Note: Fill out a separate logsheet for each tower that is undergoing decontamination, cleaning, and disinfection

Record/initialize when each step is complete.	**Bldg/Tower #:** _____ **Tower Serial# :** _____ **Date:** _____
1. Notify Associate Facilities Maintenance Coordinator (Eckert) and/or Feedwater Systems before starting.	1. Tech. initials when complete _____
2. Notify EH&S ext. 4038, provide tower serial # and date starting.	2. Tech. initials when complete _____
3. Isolate system – shut off heat load, shut off fans and blowdown, close any nearby building air intake vents.	3. Tech. initials when complete _____
4. Continue to operate recirc pumps.	4. Tech. initials when complete _____
5. Add biocide (sodium hypochlorite) to maintain 5 to 10 ppm free halogen (chlorine) residual for at least one hour.	Start time: _____ am/pm Residual Cl (ppm): _____ am/pm
6. Add biodispersant or anti-foaming agent, as needed.	6. Tech. initials when complete _____
7. Monitor and maintain system pH as halogen disinfection slows at higher pH. Maintain pH between 7.0 and 7.6 S.U. for chlorine biocide. (record pH, residual free Cl and end time)	pH at start: _____ SU Residual Cl: _____ ppm pH at end: _____ SU End time: _____ am/pm
8. Dehalogenate and immediately drain entire system to sanitary sewer system.	8. Tech. initials when complete _____
9. Flush system with disinfected water.	9. Tech. initials when complete _____
10. Clean all wetted surface. Remove visible accumulations of sludges/debris. Pay attention to stagnant areas/dead legs. Mechanically clean tower fill, supports cell partitions, sump. (initialize when complete)	10. Tech. initials when complete _____
11. Drain entire system to sanitary sewer. (initialize when complete)	11. Tech. initials when complete _____

Notes:

A. All Campus Services and Contracted Service Provider employees performing cooling tower system disinfection (i.e., applying biocide) shall meet DEC pesticide requirements and wear personnel protective equipment (respirators/gloves/tyvek) – see Sections V of Cooling Tower Management Plan.

B. Per NYS DOH, stabilized halogen products should not be used for decontamination/disinfection.

C. pH specification for bromine biocide is between 7.0 to 8.7 units.

D. At higher pH values treatment times may need to be extended per advisement of Contracted Service Provider.

Distribution: EH&S, S. Eckert

APPENDIX D-3

End-of-Season System Decontamination and Disinfection Logsheet for Ice Rink Evaporative Condenser
Buffalo State College

Complete Steps 1 through 11 Below	**Bldg/Tower #: _Ice Rink_____** **Tower Serial# :___ U041158701_____** **Date: _____**
1. Notify Associate Facilities Maintenance Coordinator (Eckert) and/or Feedwater Systems before starting.	1. Tech. initials when complete _____
2. Notify EH&S ext. 4038, provide tower serial # and date starting.	2. Tech. initials when complete _____
3. Isolate system – shut off heat load, shut off fans and blowdown, close any nearby building air intake vents.	3. Tech. initials when complete _____
4. Continue to operate recirc pumps.	4. Tech. initials when complete _____
5. Add biocide (sodium hypochlorite) to maintain 5 to 10 ppm free halogen (chlorine) residual for at least one hour.	Start time: _____ am/pm Residual Cl (ppm): _____ am/pm
6. Add biodispersant or anti-foaming agent, as needed.	6. Tech. initials when complete _____
7. Monitor and maintain system pH as halogen disinfection slows at higher pH. Maintain pH between 7.0 and 7.6 S.U. for chlorine biocide. (record pH, residual free Cl and end time)	pH at start: _____ SU Residual Cl: _____ ppm pH at end: _____ SU End time: _____ am/pm
8. Dehalogenate and immediately drain entire system to sanitary sewer system.	8. Tech. initials when complete _____
9. Flush system with disinfected water.	9. Tech. initials when complete _____
10. Clean all wetted surface. Remove visible accumulations of sludges/debris. Pay attention to stagnant areas/dead legs. Mechanically clean tower fill, supports cell partitions, sump. (initialize when complete)	10. Tech. initials when complete _____
11. Drain entire system to sanitary sewer. (initialize when complete)	11. Tech. initials when complete _____

Notes:

A. All Campus Services and Contracted Service Provider employees performing cooling tower system disinfection (i.e., applying biocide) shall meet DEC pesticide requirements and wear personnel protective equipment (respirators/gloves/tyvek) – see Sections V of Cooling Tower Management Plan.

B. Per NYS DOH, stabilized halogen products should not be used for decontamination/disinfection.

C. pH specification for bromine biocide is between 7.0 to 8.7 units.

D. At higher pH values treatment times may need to be extended per advisement of Contracted Service Provider.

Distribution: EH&S, Feedwater Systems, S. Eckert

APPENDIX D-4

Emergency Decontamination, Cleaning and Disinfection Logsheet for Cooling Towers – Buffalo State College

Note: Fill out a separate logsheet form for each tower that is undergoing emergency decontamination & disinfection

Follow Steps 1 through 16 (below) and record/initialize when each step is complete.	**Bldg/Tower #:** _____ **Tower Serial# :** _____ **Date:** _____
1. Notify Associate Facilities Maintenance Coordinator (Eckert) and/or Feedwater Systems before starting.	1. Tech. initials when complete _____
2. Notify EH&S ext. 4038, provide tower serial # and date starting.	2. Tech. initials when complete _____
3. Isolate system – shut off heat load, shut off fans and blowdown, close any nearby building air intake vents.	3. Tech. initials when complete _____
4. Continue to operate recirc pumps.	4. Tech. initials when complete _____
5. Add biocide (sodium hypochlorite) to maintain 5 to 10 ppm free halogen (chlorine) residual for at least one hour.	Start time: _____ am/pm Residual Cl (ppm): _____ am/pm
6. Add biodispersant or anti-foaming agent, as needed.	6. Tech. initials when complete _____
7. Monitor and maintain system pH as halogen disinfection slows at higher pH. Maintain pH between 7.0 and 7.6 S.U. for chlorine biocide. (record pH, residual free Cl and end time)	pH at start: _____ SU Residual Cl: _____ ppm pH at end: _____ SU End time: _____ am/pm
8. Dehalogenate and immediately drain entire system to sanitary sewer system.	8. Tech. initials when complete _____
9. Flush system with disinfected water.	9. Tech. initials when complete _____
10. Clean all wetted surface. Remove visible accumulations of sludges/debris. Pay attention to stagnant areas/dead legs. Mechanically clean tower fill, supports cell partitions, sump. (initialize when complete)	10. Tech. initials when complete _____
11. Drain entire system to sanitary sewer. (initialize when complete)	11. Tech. initials when complete _____
12. Refill with clean water dosed to 1 to 5 ppm free residual chlorine and maintain/adjust pH between 7.0 to 7.6 units (for chlorine biocide) for at least 30 minutes (record start time, free residual Cl, pH and end time)	Start time: _____ am/pm Residual chlorine: _____ ppm pH at end: _____ SU End time: _____ am/pm
13. Dehalogenate and immediately drain entire system to sanitary sewer system. (initialize when complete)	13. Tech. initials when complete _____
14. Refill system with clean water (initialize when complete).	14. Tech. initials when complete _____
15. Reestablish routine biocide treatment and test for biocide residual. (record free residual test result)	Free residual (Br, Cl): _____ ppm Conductivity _____ ppm
16. Notify Associate Facilities Maintenance Coordinator (Eckert) & EH&S (ext. 4038) when completed. (initialize when complete)	16. Tech. initials when complete _____

Notes:

1. All Campus Services and Contracted Service Provider employees performing cooling tower system disinfection (i.e., applying biocide) shall meet DEC pesticide requirements and wear personnel protective equipment (respirators/gloves/tyvek) – see Sections V of Cooling Tower Management Plan.

2. Per DOH stabilized halogen products should not be used for decontamination/disinfection.

3. pH specification for bromine biocide is between 7.0 to 8.7.

4. At higher pH values treatment times may need to be extened per advisement of Contracted Service Provider.

Distribution: EH&S, Feedwater Systems, S. Eckert

COOLING TOWER ROUTINE INSPECTION/SERVICE LOGSHEET

Updated September 2016 Work Order # CS-

Building Name/Tower # (Inspect at least weekly)	Serial #	Routine Water Treatment (y/n)	Non-Routine Treatment (Identify)**	Instruments Operating Correctly (√ if ok)					Water Sample Visual Check (Clear or Cloudy/Dirty)**	Biocide (ClO_2) Free Residual Reading (ppm) (0.1 to 1.0 ppm)	Conductivity Controller Reading (ppm) (< 1,500 ppm)	Conductivity Meter Reading (ppm) (< 1,500 ppm)	Tech. Initials	Service Date	Loss of biocide, loss of conductivity or power outage > 5 days? (Identify)*	Corrosion Monitoring Results
				ORP Controller	Chemical Supply/Pumps	Biocide Feedvalve Open	MakeUp H_2O Level Control	Blowdown Solenoid								
Bulger Communications	T011283															
B.P. Art Center #1	U070228701															
B.P. Art Center #2	U070228702															
Butler Library #1	U013127501															
Butler Library #2	U013127502															
Campbell (Union) #1	U040438201															
Campbell (Union) #2	U040438204															
Caudell Hall	14-692142															
Classroom Bldg. #1	U013129901															
Classroom Bldg. #2	U013129902															
Cleveland Hall	U013128901															
Houston Gym #1	U135001103-01-01															
Houston Gym #2	U135001103-01-02															
Ice Rink	U041158701															
SAMC #1	9-375375															
SAMC #2	9-375374															
STAC #1	10-377774															
STAC #2	10-377773															
STAC #3	10-377772															
Technology Bldg. #1	12-4729659															
Technology Bldg. #2	12-4729660															
Twin Rise	85-7096															

Notes: * NOTIFY SUPERVISOR, ASSOCIATE FACILITIES PROGRAM COORDINATOR and SERVICE VENDOR IMMEDIATELY. REQUIRES emergency sampling and analysis for legionella per DOH. Fill out back of sheet.

Outages less than 5 days may require draing, flushing, and refill of the system. Contact Feedwater Systems for recommendations.

** Indicate "Online-Disinfection", "On-Line Decontamination", "Drain and Flush", "Seasonal Start-Up", "Troubleshooting", "End of season draining and cleaning," "Decommisioning and cleaning" (for permanent removal from service), or describe action.

Refer to back side of this logsheet or the Cooling Tower Maintenance Plan for definitions of these terms.

Distribution: S. Eckert

COOLING TOWER NON-ROUTINE SERVICE LOGSHEET

Updated September 2016

Building Name/Tower #	Serial # (see front for list)	Date & Time	Tech. Initials	Issue Found During Routine Weekly Service (1)	Corrective Actions (2)			Tower Draining - Dehalogenate and Check/ Adjust pH (halogen (CLO2, Br, NaOCL) target < 0.02 ppm and pH target 6.0 ≤ pH ≤ 9.0)	Initial Shock Treatment (for "seasonal start-up") with Chlorine Dioxide (CLO2) or Sodium Hypochlorite (NaOCL)				Emergency Disinfection and Cleaning (must be performed together)	Comments
					Describe Action Taken(2)	First Retest Reading (ppm CLO2, conductivity, or ORP)	Second Retest Reading if necessary (ppm CLO2, conductivity, or ORP)		CLO2 Initial Reading (ppm)	CLO2 Final Reading (after 6 hours)	NaOCL Initial Reading	NaOCL Final Reading (after 6 hours)		
				Identify (1)	Identify (2)	(CLO2: 0.1 to 1.0 ppm; Conductivity < 1500 ppm)	(CLO2: 0.1 to 1.0 ppm; Conductivity < 1500 ppm)	Check Here (√) when complete	(target 0.8 to 1.0 ppm)	(target 0.8 to 1.0 ppm)	(NaOCL 4 to 5 ppm, 7.0 ≤ pH ≤7.6)	(NaOCL 4 to 5 ppm; 7.0 ≤ pH ≤7.6)	Check Here (√) and fill out Emergency Disinfection Checklist	

Notes: (1) Indicate Conductivity >1500 ppm; CLO2 < 0.1 ppm; Water clarity (dirty); power outage; conductivity, ORP, or pump equipment failure; and/or describe off-normal condition.

(2) Indicate "Online-Disinfection,"* "On-Line Decontamination,"**, "Drain and Flush," "Emergency Disinfection," "Seasonal Start-Up," "Troubleshooting," "End of season draining and cleaning," "Decommisioning and cleaning" (for permanent removal from from service), and/or describe equipment adjustment .

(3) "Emergency Disinfection and Cleaning" required when: 1) Equipment failure, power outage/failure, loss of biocide treatment, or loss of conductivity control exceeds 5 days; or 2) Legionella test results exceed 1000 cfu/mL.

* "On-Line disinfection" means dose the cooling tower with either a different biocide or increased concentration than currently used under advisement of Contracted Service provider. Refer to Cooling Tower maintenance plan for instances when "On-Line Disinfection" is mandated by DOH. Contact Feedwater Systems for instructions.

** "On-Line decontamination" refer to Cooling Tower maintenance plan for instances when "On-Line decontamination" is mandated by DOH and procedure for performing.

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APPENDIX E
Contract Service Provider Inspection Reports and Lab Test Results (maintained in EH&S Office, 878-4038)

Appendix E Notes:

* Completed Contract Service Provider Inspection Reports and Laboratory Test Result Reports are maintained and available by contacting the Environmental Health and Safety Office at 878-4038

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APPENDIX F
Safety Data Sheets for Chemicals Used in Cooling Towers

BWA™
Water Additives

SAFETY DATA SHEET
BROMICIDE TABLETS

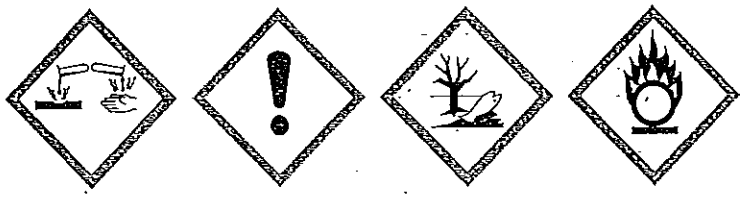
1. IDENTIFICATION

Product Name	BROMICIDE TABLETS
Chemical Name	1-Bromo-3-chloro-5, 5-dimethylhydantoin
Product No.	100404, 100408, 100411, 100870, 100423, 101335
Identification No.	1479
Identified uses	Biocides for water treatment.
Supplier	BWA Water Additives US LLC 1979 Lakeside Parkway Suite 925, Tucker, GA30084 USA T: +1 800 600 4523 T: +1 678 802 3050 E: msds@wateradditives.com
Emergency Telephone	CHEMTREC Phone: 1-800-424-9300

2. HAZARD(S) IDENTIFICATION

EMERGENCY OVERVIEW

EPA REGISTRATION No: 83451-4 EPA SIGNAL WORD: DANGER. EPA FIFRA Labelling information in Section 15 (PRN 2012-1)

Appearance	Tablet.
Color	White / off-white.
Odor	Slight odor. Halogen
GHS Pictogram	
Signal Word	Danger

Hazard Statements

H272	May intensify fire; oxidizer.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.

Precautionary Statements

P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+330+331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+361+353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/physician.
P501	Dispose of contents/container in accordance with national regulations.

Contains 1-Bromo-3-chloro-5,5-dimethylhydantoin

BROMICIDE TABLETS

GHS Classification

Physical and Chemical Hazards	Ox. Sol. 3 - H272
Human health	Acute Tox. 4 - H302;Skin Corr. 1B - H314;Skin Sens. 1 - H317
Environment	Aquatic Acute 1 - H400

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM - WHMIS

WHMIS Label

Oxidizing Material.

Corrosive Material.

Controlled Product Classification
Canadian WHMIS Classification C E

Inhalation
May cause irritation to the respiratory system.

Ingestion
Harmful if swallowed.

Skin Contact
Causes burns. May cause sensitization by skin contact.

Eye Contact
Causes burns.

Health Warnings
This substance is corrosive. Contact with acids liberates toxic gas.

Route Of Entry
Skin and/or eye contact. Ingestion. Inhalation.

Other Health Effects
This substance has no evidence of carcinogenic properties.

3. COMPOSITION/INFORMATION ON INGREDIENTS

1-Bromo-3-chloro-5,5-dimethylhydantoin	60-100%
CAS No.: 16079-88-2 EC No.: 240-230-0	
GHS Classification Ox. Sol. 3 - H272; Acute Tox. 4 - H302; Skin Corr. 1B - H314; Skin Sens. 1 - H317; Aquatic Acute 1 - H400	

Composition Comments
1-bromo-3-chloro-5, 5-dimethylhydantoin

4. FIRST-AID MEASURES

Description of first aid measures

Inhalation
Provide fresh air, warmth and rest, preferably in a comfortable upright sitting position. Get medical attention.

Ingestion
DO NOT INDUCE VOMITING! NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Rinse mouth thoroughly. Get medical attention immediately!

Skin Contact
Remove contaminated clothing. Rinse the skin immediately with lots of water. Get medical attention immediately!

Eye Contact
Remove victim immediately from source of exposure. Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. Get medical attention immediately

Most important symptoms and effects, both acute and delayed

Inhalation
Inhaltion of dust may cause irritation of the respiritory tract.

Ingestion
May cause stomach pain or vomiting. May cause chemical burns in mouth and throat. Due to the physical nature of this material it is unlikely that swallowing will occur.

Skin Contact
Chemical burns. Burning pain and severe corrosive skin damage.

Eye Contact
Extreme irritation of eyes and mucous membranes, including burning and tearing.

Indication of any immediate medical attention and special treatment needed

Notes To The Physician
If lavage is performed suggest endotracheal and/or esophageal control.Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. The decision of whether to induce vomiting or not should be made by a physician.Chemical eye burns may require extended irrigation.Obtain prompt consultation preferably from an opthalmologist.If burn is present, treat as any thermal burn, after decontamination.No specific antidote.Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE-FIGHTING MEASURES

Auto Ignition Temperature (°C)
Not available.

Flammability Limit - Lower(%)
Not applicable.

Flammability Limit - Upper(%)
Not applicable.

Flash point (°C)
Not available.

Extinguishing Media
Use: Water spray, fog or mist. Alcohol resistant foam. DO NOT use CO2 or dry chemicals.

Unsuitable extinguishing media
Carbon dioxide (CO2). Dry chemicals.

Unusual Fire & Explosion Hazards
Fire causes formation of toxic gases.

Specific Hazards
Toxic gases/vapors/fumes of: Bromine. Chlorine. Oxides of: Carbon. Nitrogen.

Special Fire Fighting Procedures
Move container from fire area if it can be done without risk. Keep run-off water out of sewers and water sources. Dike for water control.

Protective Equipment For Fire-Fighters
Self contained breathing apparatus and full protective clothing must be worn in case of fire.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Follow precautions for safe handling described in this material safety data sheet. For personal protection, see section 8.

Environmental Precautions
Avoid release to the environment. To prevent release, place container with damaged side up.

Spill Clean Up Methods
Provide ventilation and confine spill. Do not allow runoff to sewer. Collect and reclaim or dispose in sealed containers in licensed waste. Containers with collected spillage must be properly labelled with correct contents and hazard symbol. Wash thoroughly after dealing with a spillage. Avoid generation and spreading of dust. Avoid contact with water.

Reference to other sections
For personal protection, see section 8. For waste disposal, see section 13.

7. HANDLING AND STORAGE

Handling
Ventilate well, avoid breathing vapors. Use approved respirator if air contamination is above accepted level. Do not use in confined spaces without adequate ventilation and/or respirator. Avoid spilling, skin and eye contact. Avoid acids, moisture, and combustible materials. Avoid handling which leads to dust formation.

Storage
Store in tightly closed original container in a dry, cool and well-ventilated place. Keep containers tightly closed. Protect from light, including direct sunrays. Keep away from heat, sparks and open flame.

BROMICIDE TABLETS

Storage Class
Oxidizer storage. NFPA STORAGE CLASSIFICATION:NFPA Oxidiser Class 2.

Specific end use(s)
The identified uses for this product are detailed in Section 1.2.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredient Comments
No exposure limits noted for ingredient(s).

Protective Equipment

Process Conditions
Use engineering controls to reduce air contamination to permissible exposure level. Provide eyewash station.

Engineering Measures
All handling to take place in well-ventilated area.

Respiratory Equipment
Use specified dust masks.

Hand Protection
Selection of a suitable glove depends on work conditions and whether the product is present on its own or in combination with other substances. Use protective gloves made of: Neoprene, nitrile, polyethylene or PVC. Gloves should be replaced immediately if signs of degradation are observed.

Eye Protection
Use approved safety goggles or face shield.

Other Protection
Wear appropriate clothing to prevent any possibility of skin contact.
Wear dust masks in dusty areas.

Hygiene Measures
No specific hygiene procedures noted, but good personal hygiene practices are always advisable, especially when working with chemicals. Isolate contaminated clothing and wash before reuse.

Skin Protection
Wear apron or protective clothing in case of contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Tablet.
Color	White / off-white.
Odor	Slight odor. Halogen
Solubility	Slightly soluble in water.

Initial boiling point and boiling range (°C)
Not available.

Melting point (°C)	156 - 162

Relative density
Not applicable.

Bulk Density	~900 kg/m3

Vapor density (air=1)
Not available.

Vapor pressure	0.0038 Pa 25°C

Evaporation rate
Not available.

Evaporation Factor
Not available.

pH-Value, Conc. Solution
Not available.

pH-Value, Diluted Solution	3.5 @ 0.15 %

Viscosity
Not available.

Solubility Value (G/100G H2O@20°C)	0.15
Decomposition temperature (°C)	162°C

Odour Threshold, Lower
Not available.
Odour Threshold, Upper
Not available.
Flash point (°C)
Not available.
Auto Ignition Temperature (°C)
Not available.
Flammability Limit - Lower(%)
Not applicable.
Flammability Limit - Upper(%)
Not applicable.

Partition Coefficient (N-Octanol/Water)	log Pow 0.35

Explosive properties
Scientifically unjustified.
This material is oxidising keep away from fire/heat/sources of ignition.
Not available.

10. STABILITY AND REACTIVITY

Reactivity
This material has oxidising properties.
Stability
Stable under normal temperature conditions. Avoid Moisture.
Hazardous Polymerisation
Will not polymerise.
Conditions To Avoid
Generates toxic gas in contact with acid. Avoid heat, flames and other sources of ignition. Avoid excessive heat for prolonged periods of time.
Materials To Avoid
Strong acids. Strong alkalis. Strong reducing agents.
Hazardous Decomposition Products
Toxic gases/vapors/fumes of: Hydrogen bromide (HBr). Bromine. Hydrogen chloride (HCl). Chlorine. Oxides of: Carbon. Nitrogen.

11. TOXICOLOGICAL INFORMATION

Other Health Effects
This substance has no evidence of carcinogenic properties.

Acute toxicity:
Acute Toxicity (Oral LD50)
578 mg/kg Rat

Acute Toxicity (Dermal LD50)
> 2000 mg/kg Rabbit

Germ cell mutagenicity:
Genotoxicity - In Vitro
Ames Test
Negative.

12. ECOLOGICAL INFORMATION

BROMICIDE TABLETS

Ecotoxicity
The product contains a substance which is very toxic to aquatic organisms.
Acute Toxicity - Fish
LC50 96 hours 0.87 mg/l Onchorhynchus mykiss (Rainbow trout)
Acute Toxicity - Aquatic Invertebrates
EC50 48 hours 0.46 mg/l Daphnia magna
Degradability
DMH is readily biodegradable in a CO2 Evolution study and passes the 10-day window criteria. DMH has also been shown to be rapidly degraded in a water/sediment system.
Chemical Oxygen Demand
1.005 g O2/g substance
Bioaccumulative potential
Low bioaccumulation potential
Partition coefficient
log Pow 0.35
Mobility:
Information not available.
Results of PBT and vPvB assessment
An assessment of the substance's properties indicates it is neither a PBT or vPVB.
Acute Toxicity. Lc50 96 Hours, Mg/L 640 American Oyster

13. DISPOSAL CONSIDERATIONS

Waste Management
When handling waste, consideration should be made to the safety precautions applying to handling of the product.
Disposal Methods
Dispose of waste and residues in accordance with local authority requirements.
Absorb in vermiculite or dry sand and dispose of at a licenced hazardous waste collection point.
Liquid material should be incinerated. Material absorbed onto sand or earth should be disposed of as solid waste in accordance with local regulations. Empty packaging may contain product residues and due consideration should be given prior to disposal.

14. TRANSPORT INFORMATION

UN No. (DOT/TDG)	1479
NA No.	1479
UN No. (IMDG)	1479
UN No. (ICAO)	1479
DOT Proper Shipping Name	OXIDIZING SOLID, N.O.S., (contains bromo-chloro-dimethylhydantoin) 5.1, PGIII, MARINE POLLUTANT
TDG Proper Shipping Name	OXIDIZING SOLID, N.O.S., (contains bromo-chloro-dimethylhydantoin) 5.1, PGIII, MARINE POLLUTANT

DOT Hazard Class
5.1
DOT Hazard Label
Oxidiser

TDG Class	5.1
IMDG Class	5.1
ICAO Class	5.1

Transport Labels

DOT Pack Group III

TDG Pack Group III

IMDG Pack Group III

Air Pack Group III

Environmentally Hazardous Substance/Marine Pollutant

EMS F-A, S-Q

Markings
MARINE POLLUTANT

Transport In Bulk according to Annex II of MARPOL 73/78 and the IBC Code Notes
Not applicable.

Classification Code (Adr) O2

15. REGULATORY INFORMATION

Regulatory Status (US)
SECTION 313: This product does not contain toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR Part 372. PROPOSITION 65: This product does not contain chemicals considered by the State of California's Safe Drinking Water and Toxic Enforcement Act of 1986 as causing cancer or reproductive toxicity and for which warnings are now required. TSCA: The ingredients of this product are on the TSCA Inventory. TSCA Export Notification Section 12b. EPA REGISTRATION NUMBER: 83451-4

Regulatory References
29 CFR 1910.1010 Federal Regulations (OSHA Standard).

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities
None of the ingredients are listed.

CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)
None of the ingredients are listed.

SARA 313 Emission Reporting
None of the ingredients are listed.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins
None of the ingredients are listed.

Massachusetts "Right To Know" List
None of the ingredients are listed.

Rhode Island "Right To Know" List
None of the ingredients are listed.

Minnesota "Right To Know" List
None of the ingredients are listed.

New Jersey "Right To Know" List
None of the ingredients are listed.

Pennsylvania "Right To Know" List
None of the ingredients are listed.

Fifra Information
This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:
DANGER.
Causes irreversible eye damage and skin burns.
Harmful if swallowed.
Irritating to nose and throat.

BROMICIDE TABLETS

Do not get in eyes, on skin, or on clothing.

International Inventories

EU - EINECS/ELINCS
The following ingredients are listed.
1-Bromo-3-chloro-5, 5-dimethylhydantoin

Canada – DSL/NDSL
All ingredients are listed or exempt.

US - TSCA
All ingredients are listed or exempt.

US – TSCA 12(b) Export Notification
All ingredients are listed or exempt.

Australia - AICS
All ingredients are listed or exempt.

Japan – MITI
All ingredients are listed or exempt.

Korea - KECI
All ingredients are listed or exempt.

China - IECSC
All ingredients are listed or exempt.

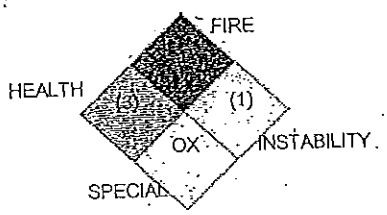
Phillippines – PICCS
All ingredients are listed or exempt.

16. OTHER INFORMATION

HAZARDOUS MATERIAL INFORMATION SYSTEM (HMIS)

HEALTH	3
FLAMMABILITY	1
PHYSICAL	1
PERSONAL PROTECTION	C

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)



General Information
For advice on chemical emergencies, spillages, fires or first aid in relation to this product please contact the relevant emergency number below :
EU/English Speakers - +44 (0) 1235 239 670 (NCEC)
Arabic Speakers - +44 (0) 1235 239 671
Asia/Pacific countries - +65 3158 1074
Within Mainland China: +86 532 8388 9090 (NRCC).
To/From China: +86 10 5100 3039 (NCEC)

Revision Comments
Conversion to GHS (HCS 2012 / WHMIS 2015)

Issued By	BWA Water Additives Regulatory Group, +44(0)1618646699
Revision Date	4th March, 2015
Revision	6
Sds No.	10804

BROMICIDE TABLETS

Disclaimer

For safety reasons it is IMPERATIVE that customers:-

1. Ensure that all those within their control who use the products are supplied with all relevant information contained within the Safety Data Sheet and Technical Bulletin concerning the applications for which the product is designed and any instructions and warnings contained therein.

2. Consult BWA Water Additives before using or supplying the product for any other applications. The information contained herein is based on the present state of our knowledge and is intended to describe our products from the point of view of safety requirements. It should not therefore be construed as guaranteeing specific properties.

Enviro Tech Chemical Services, Inc. 500 Winmoore Way Modesto, CA 95358

SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION

Product Identifier: ENVIROCHLORITE 25 **Product Code:** 60

Registration Number: 63838-22

Enviro Tech Chemical Services, Inc.
500 Winmoore Way Modesto, CA 95358
(209) 581-9576 (7 AM to 5 PM, PST, Monday to Friday)

24 Hr. Emergency Tel.#: 800-424-9300

SECTION 2 - HAZARDS IDENTIFICATION

Classification of the Substance or Mixture:

Skin Corrosion - Category 1
Serious Eye Damage - Category 1
Acute Toxicity - Oral Category 4
Acute Toxicity - Dermal Category 4
Acute Toxicity - Inhalation Category 3

Signal Word: DANGER

Hazard Statements:
Causes severe skin burns and eye damage
May intensify fire; oxidizer
Harmful if swallowed
Harmful in contact with skin
Toxic if inhaled

Precautionary Statements:
Wear protective gloves/protective clothing/eye protection/face protection.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER or doctor/physician.
IF INHALED: Call a POISON CENTER or doctor/physician if you feel unwell.

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	CAS Number	Concentration
SODIUM CHLORITE	7758-19-2	20-30%

SECTION 4 - FIRST-AID MEASURES

Inhalation: Get medical advice/attention if you feel unwell or are concerned.
Skin Contact: Take off immediately contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Rinse skin with lukewarm, gently flowing water/shower with a flushing duration of 30 minutes. Immediately call POISON CENTER/doctor. Wash contaminated clothing before re-use.
Eye Contact: Remove source of exposure or move person to fresh air. Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for 15-20 minutes. Take care not to rinse contaminated water into the unaffected eye or into the face. If eye irritation persists: Get medical advice/attention.
Ingestion: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. If vomiting occurs naturally, lie on your side, in the recovery position.
Most Important Symptoms and Effects, both Acute and Delayed: Causes severe skin burns and eye damage, burning of the mouth, throat, and esophagus.
Indication of any Immediate Medical Attention and Special Treatment Needed: Treat symptomatically

SECTION 5 - FIRE-FIGHTING MEASURES

Extinguishing Media: Flood with water.

Special hazards arising from the substance of mixture: Product is non-combustible. On decomposition releases oxygen which may intensify fire.

Flammability classification (OSHA 29 CFR 1910.106) (Hazcom 2012): Non flammable

Hazardous Combustion Products: Non combustible

SAFETY DATA SHEET

Special protective equipment and precautions for firefighters: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering.
Methods and materials for containment and cleaning up: SMALL SPILLS (less than 1 gallon): Neutralize with soda ash or cover with dry earth, sand or other non combustible material, place into loosely covered plastic containers for later disposal. If neutralized, material can be diluted into drain. LARGE SPILL: Restrict access to area until completion of clean up. Prevent liquid from entering sewers or waterways. Stop or reduce leak if safe to do so. Dike with inert material (sand, earth, etc.). Collect into plastic containers for disposal. Ensure adequate decontamination of tools and equipment following clean up.
Special spill response procedures: Prevent from entering sewers, waterways, or low areas.

SECTION 7 - HANDLING AND STORAGE

Precautions for Safe Handling: Wear at least chemical resistant gloves and eye protection, face shield, and chemical resistant garments when handling, moving or using this product. Do not contaminate water, food, or feed by storage or disposal.
Conditions for Safe Storage: Store in a cool, dry, well ventilated place away from direct sunlight. Keep container closed when not in use.
Incompatible Materials: Avoid strong reducing agents, soft metals, heat and acids.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation and engineering measures: Forced air, local exhaust, or open air is adequate.

Respiratory Protection: Use appropriate NIOSH respirator.

Skin Protection: Wear chemical resistant gloves and chemical resistant garments when handling, wash garments before re-use.

Eye/Face Protection: Wear chemical goggles; also wear a face shield if splashing hazard exists.

Other Protective Equipment: Eye wash facility and emergency shower should be in close proximity.

General Hygiene Conditions: Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Remove and wash contaminated clothing before re-use. Handle in accordance with good industry hygiene and safety practice.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear colorless to cloudy liquid

Odor: Odorless

pH: <12.0

Melting/Freezing point: No information available.

Initial boiling point and boiling range: No information available.

Flammability (solid, gas): Non flammable

Relative density: 1.25 g/mL

Solubility in Water: Complete

Decomposition temperature: No information available.

Viscosity: 5-20 cSt at 20°C / 68°F

SECTION 10 - STABILITY AND REACTIVITY

Reactivity: Reactive with certain acids, reducing agents, organic materials, metals, bases and alkalis.
Chemical Stability: Stable under normal conditions
Possibility of Hazardous Reactions: May react with incompatible materials
Conditions to Avoid: Incompatible materials and high temperatures
Incompatible Materials: Reducing agents, wood, paper and other combustibles, iron and other heavy metals, copper alloys and caustic.
Hazardous Decomposition Products: Oxygen which supports combustion.

SECTION 11 - TOXICOLOGICAL INFORMATION

<u>Information on likely routes of exposure:</u>

Routes of entry - Inhalation: YES

Routes of entry - skin & eye: YES

Routes of entry - ingestion: YES

Routes of entry - skin absorption: NO

SAFETY DATA SHEET

Potential Health Effects:

Signs and symptoms of short term (acute) exposure:

Inhalation: Inhalation of the mist may produce severe irriation of respiratory tract, characterized by coughing, choking, shortness of breath, headaches, dizziness, nausea, weakness and/or drowsiness.

Ingestion: Corrosive! Swallowing causes severe burns of mouth, throat, and stomach. Severe scarring of tissue, corrosion, permanent tissue destruction and death may result. Symptoms may include severe pain, nausea, vomiting, diarrhea, shock, hemorrhaging and/or fall in blood pressure. Damage may appear days after exposure.

Skin: Corrosive! Contact with skin causes irritation or severe burns and scarring with greater exposures.

Eye: Corrosive! Causes irritation of eyes, and with greater exposures it can cause burns that may result in permanent impairment of vision, even blindness.

Potential Chronic Health Effects:

Mutagenicity: Not known to have mutagenic effects in humans or animals.

Carcinogenicity: Not expected to be a carcinogen or tumorigenic.

Reproductive effects: No known reproductive effects in humans or animals.

Sensitization to material: Not a known sensitizer in humans or animals.

Specific target organ effects: No known specific target organ effects.

Toxicological data: The calculated ATE values for this mixture are:

ATE oral = 528 mg/kg

ATE dermal = 1280 mg/kg

ATE inhalation = 0.74 mg/L

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: May be harmful to aquatic environment.

Persistence and degradability: Not expected to persist. No information available.

Bioaccumulation potential: Not expected to bioaccumlate.

Mobility in soil: No information available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Handling for disposal: Do not contaminate water, food, or feed by storage and/or disposal. When handling refer to protective measures listed in sections 7 and 8. Empty residue from containers, rinse container well.

Method of disposal: Dispose of in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.

RCRA: If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Corrosivity D002

SECTION 14 - TRANSPORTATION INFORMATION

Certain shipping modes or package sizes may have exceptions from the transport regulations. The classification provided may not reflect those exceptions and may not apply to all shipping modes or package sizes.

Please note the GHS and DOT Standarts are NOT identical and therefore can have varying classifications

Certain shipping modes or package sizes may have exceptions from the transport regulations. The classification provided may not reflect those exceptions and may not apply to all shipping modes or package sizes.

US 49 CFR/DOT/IATA/IMDG Information:

UN No.: 1908

UN Proper Shipping Name: Chlorite solution

Transportation hazard class(es): 8

Packing Group: II

Environmental hazards: Not a Marine Pollutant

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

TSCA Information: All components are listed on the TSCA inventory.

US CERCLA Reportable quantity (RQ): Non regulated material.

SARA Title III: Acute Health Hazard

SAFETY DATA SHEET

SECTION 16 - OTHER INFORMATION

Legend:

SARA: The Superfund Amendments and Reauthorization Act

RCRA: Resource Conservation and Recovery Act

TSCA: Toxic Substances Control Act

CFR: Code of Federal Regulations

DOT: Department of Transportation

ATE: Acute Toxicity Estimate

Preparation date: 1/30/2015

SAFETY DATA SHEET

1. IDENTIFICATION

Product Name:	**Sodium Hypochlorite**
Synonyms:	Bleach, hypochlorite solution, SUPERCHLOR, SUPERCHLOR SHOCK, NaOCl
CAS Number:	7681-52-9
Product Use:	Sanitation/disinfection in potable water, swimming pool chlorination, wastewater treatment, institutional and industrial cleaners, paper and textile manufacture.
Manufacturer/Supplier:	Slack Chemical Co., Inc 465 South Clinton St. Carthage, NY 13619 800.479.0430

Transportation Emergency Number: CHEMTREC: 800.424.9300

2. HAZARDS IDENTIFICATION

GHS Classification

Physical Hazards	Corrosive to metals	Category 1
Health Hazards	Skin corrosion/irritation	Category 1
	Eye damage/irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3
Environmental Hazards	Hazardous to aquatic environment, acute	Category 1
	Hazardous to aquatic environment, chronic	Category 2

GHS Label Elements

Signal Word: **DANGER!**

Hazard Statements

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P234	Keep only in original packaging.

P260	Do not breathe dusts or mists.
P261	Avoid breathing dust/fume/gas/mist/vapors/spray.
P264	Wash thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301/330/331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303/361/353	IF ON SKIN: Take of immediately all contaminated clothing. Rinse skin with water.
P304/340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305/351/338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor.
P312	Call a POISON CENTER or doctor if you fell unwell.
P321	Specific treatment (see first aid section).
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material-damage.
P391	Collect spillage.
P403/233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Weight %
Sodium Hypochlorite	7681-52-9	10 - 20
Sodium Hydroxide	1310-73-2	< 2

4. FIRST AID MEASURES

Inhalation: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice. Have the product container or label with you when calling a poison control center, doctor, or going for treatment.

Eye: Hold eyelid(s) open and rinse slowly and gently with water for 15 – 20 minutes. Remove contact lenses, if present, after the first 5 minutes and then continue rinsing. Call a poison control center or doctor for treatment advice.

Skin: Take off contaminated clothing and rinse skin immediately with plenty of water for 15 – 20 minutes. Call a poison control center or doctor for treatment advice. Discard contaminated clothing or launder before reuse.

Ingestion: Call a poison control center or doctor immediately for treatment advice. Have affected person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Water fog, foam, dry chemical powder or carbon dioxide.

Fire Fighting Procedures: In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Unusual Fire and Explosion Hazards: No unusual fire or explosion hazards noted.

Combustion Products: During fire, gases hazardous to health may be formed. Contact with combustibles may initiate or promote combustion. Acid and heat accelerate decomposition. Decomposition products may include chlorine gas.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Keep unnecessary personnel away. Wear appropriate personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Absorb spillage to prevent material damage. Local authorities should be advised if significant spillages cannot be contained.

Environmental Precautions: Do not discharge into drains, water courses or onto the ground. Environmental manager must be informed of all major releases.

Methods and Materials for Containment and Cleaning Up: Large Spills: Stop the flow of material, if can be done without risk. Dike the spilled material, where possible. Absorb in vermiculite, dry sand or earth and place into suitable containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use.

7. HANDLING AND STORAGE

Precautions for Safe Handling: Wear appropriate personal protective equipment. Do not get in eyes, on skin, on clothing. Use with adequate ventilation. Observe good industrial hygiene practices. Do not apply heat or direct sunlight. Temperature and product concentration affect product quality and decomposition rates.

Conditions for Safe Storage, Including Any Incompatibilities: Keep container tightly closed. Store in a cool and well-ventilated place. Store in a corrosive resistant container. Consult container manufacturer for additional guidance. Store away from and do not mix with incompatible materials such as acids, oxidizers, organics, reducing agents, and all metals except titanium.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters:

Component	OSHA PEL-TWA	ACGIH TLV-TWA
Sodium Hydroxide (CAS 1310-73-2)	2 mg/m^3	2 mg/m^3 (Ceiling)

Engineering Controls: Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Personal Protective Equipment (PPE)

Eye/Face Protection: Wear safety glasses with side shields (or goggles) and a face shield. Wear a full-face respirator, if needed.

Skin Protection: Wear appropriate chemical resistant gloves. Wear appropriate chemical resistant clothing. Reports indicate that sodium hypochlorite can react with various fabrics usually increasing with concentration. Reactions vary significantly depending on strength of chemical, material, fabric treatment and color of dyes. Poly blend fabrics have a weaker response than natural fibers. Contact the Personal Protective Equipment manufacturer for specific information about their products.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits or to an acceptable level, an approved respirator must be worn.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquid, clear, yellow-green
Odor	Chlorine
Odor threshold	0.9 mg/m^3
pH	> 12
Melting/freezing point	-24°C (-11°F)
Boiling point	104°C (219°F)
Flash point	Not applicable
Evaporation rate	Not available
Flammability	Not applicable
Upper/lower flammability limits	Not applicable
Vapor pressure	12 mmHg (20°C)
Vapor density	Not available
Relative density	1.18 – 1.24
Solubility	100% (water)
Partition coefficient: n-octanol/water	Not available
Auto-ignition temperature	Not applicable
Viscosity	Not available

10. STABILITY AND REACTIVITY

Reactivity: The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical Stability: Material is stable under normal conditions. Stability decreases with increased concentration, low pH as well as exposure to heat, sunlight, and contamination with heavy metals such as, but not limited to; nickel, copper, cobalt and iron.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur.

Conditions to Avoid: Contact with incompatible materials. Avoid ultraviolet (UV) light sources and excessive heat. Reacts violently with strong acids. Acid contact will produce chlorine gas. Amine contact will produce chloramines.

Incompatible Materials: Strong oxidizing agents, acids, metals, organic compounds and ammonia.

Hazardous Decomposition Products: Hypochlorous acid, chlorine, and hydrochloric acid. Composition depends upon temperature and decrease in pH. Additional decomposition products, which depend upon temperature, pH and time, are sodium chlorate and oxygen.

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Ingestion: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract.
Inhalation: Vapors and spray mist may irritate throat and respiratory system and cause coughing.
Skin Contact: Causes skin burns.
Eye Contact: Causes eye burns.

Symptoms Related to Physical, Chemical and Toxicological Characteristics: Corrosive effects. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Acute Toxicity Values:

Component	Route	Species	Value
Sodium Hypochlorite (CAS 7681-52-9)	Dermal LD_{50}	Rabbit	> 2 g/kg
	Oral LD_{50}	Rat	3 – 5 g/kg
Sodium Hydroxide (CAS 1310-73-2)	Dermal LD_{50}	Rabbit	> 2 g/kg
	Oral LD_{50}	Rat	300 – 500 mg/kg

Skin Corrosion/Irritation: Causes severe skin burns.

Serious Eye Damage/Irritation: Causes severe eye damage.

Respiratory or Skin Sensitization: Not available.

Germ Cell Mutagenicity: Not available.

Carcinogenicity: This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

Reproductive Toxicity: Not available.

Specific Target Organ Toxicity (STOT) – Single Exposure: May cause respiratory irritation.

Specific Target Organ Toxicity (STOT) – Repeated Exposure: No available.

Aspiration Hazard: Not classified, however droplets of the product may be aspirated into the lungs through ingestion or vomiting and may cause a serious chemical pneumonia.

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Component	Species	Value	
Sodium Hypochlorite (CAS 7681-52-9)	Fathead minnow *(Pimephales promelas)*	5.9 mg/L	(LC_{50}-96 hr)
	Water flea *(Ceriodaphnia dubia)*	0.05 mg/L	(LC_{50}-24 hr)
Sodium Hydroxide (CAS 1310-73-2)	Brook trout *(Salvelinus fontinalis)*	25 mg/L	(LC_{50}-NR)
	Water flea *(Ceriodaphnia dubia)*	40.4 mg/L	(EC_{50}-48 hr)

Persistence/Degradability: Not available.

Bioaccumulation: Not available.

Soil Mobility: Not available.

Other Adverse Affects: No other adverse environmental effects are expected from this component.

13. DISPOSAL CONSIDERATIONS

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container may need to be disposed of as hazardous waste. Do not allow this material to drain into sewers or water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents and container in accordance with local, regional, national and/or international regulations. Empty containers should be taken to an approved waste handling site

for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (DOT)

UN/NA Number:	UN 1791
Proper Shipping Name:	Hypochlorite solutions
Hazard Class:	8
Packing Group:	PG III
Marine Pollutant:	No
Labels Required:	Corrosive
Reportable Quantity:	100 lb
Exemption(s):	49 CFR 173.154 – Quantities not over 1.3 gallons

15. REGULATORY INFORMATION

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants:
Sodium Hypochlorite (CAS 7681-52-9) – No
Sodium Hydroxide (CAS 1310-73-2) – No

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention 40 CFR 68.130:
Sodium Hypochlorite (CAS 7681-52-9) – No
Sodium Hydroxide (CAS 1310-73-2) – No

Clean Water Act (CWA) 40 CFR 401.15:
Sodium Hypochlorite (CAS 7681-52-9) – No
Sodium Hydroxide (CAS 1310-73-2) – No

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 40 CFR 302.4:
Sodium Hypochlorite (CAS 7681-52-9) – Yes
Sodium Hydroxide (CAS 1310-73-2) – Yes

SARA Section 302 Extremely Hazardous Substance 40 CFR 355:
Sodium Hypochlorite (CAS 7681-52-9) – No
Sodium Hydroxide (CAS 1310-73-2) – No

SARA Section 311/312 40 CFR 370:
Sodium Hypochlorite (CAS 7681-52-9) – Yes
Sodium Hydroxide (CAS 1310-73-2) – Yes

SARA Section 313 40 CFR 372:
Sodium Hypochlorite (CAS 7681-52-9) – No
Sodium Hydroxide (CAS 1310-73-2) – No

Toxic Substances Control Act (TSCA):
Sodium Hypochlorite (CAS 7681-52-9) – Yes
Sodium Hydroxide (CAS 1310-73-2) – Yes

Canadian Environmental Protection Act, Domestic Substance List (CEPA-DSL):
Sodium Hypochlorite (CAS 7681-52-9) – Yes
Sodium Hydroxide (CAS 1310-73-2) – Yes

California Proposition 65:

Sodium Hypochlorite (CAS 7681-52-9) – No
Sodium Hydroxide (CAS 1310-73-2) – No

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):

EPA Reg. No. 59074-20001

16. OTHER INFORMATION

HMIS RATINGS		NFPA RATINGS	
Health	2	Health	2
Flammability	0	Flammability	0
Reactivity	2	Reactivity	2

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Buffalo State
State University of New York

APPENDIX G
DOH Notification Log Form
(Current log is maintained at EH&S Office 878-4038)

Buffalo State
State University of New York

DOH Notification Log Form

Date	Initials	Tower ID and Summary