Clinton Regional Hospital	Policy and Procedures	NUMBER
	MANUAL: All Employees	EFFECTIVE DATE
	SUBJECT: Water Management Plan	REVISED REVIEWED

Purpose:

- **The purpose of this policy is to establish minimum *Legionella* risk management requirements for *building water systems*.**

Scope:

- **This policy provides minimum *legionella* risk management requirements for the design, construction, commissioning, operation, maintenance, repair, replacement, and expansion of new and existing buildings and their associated (potable and *non-potable*) water systems and components.**
- **This policy applies to human-occupied commercial, institutional, and industrial buildings. Only where specifically noted in this standard shall certain *building water systems* or parts of *building water systems* be exempt.**
- **This policy is intended for use by owners and managers of human-occupied buildings. This standard is also intended for those involved in the design, construction, installation, commissioning, operation, maintenance, and service of *centralized building water systems* and components.**

GENERAL REQUIREMENTS:

Definitions

- **Principles of a Water Management Program are management principles which shall be used to reduce the risk of *legionella associated* with *building water systems*.**
- **Analysis of Building Water Systems Are a systematic analysis of *hazardous conditions* in the *building water systems***
- **Control Locations are determined by the locations in the system where *control measures* are required.**

Program Confirmation

- **The Director of Engineering shall establish procedures to confirm, both initially and on an ongoing basis, that the *Program* is being implemented as designed (*verification*).**

Documentation and Communication

- **The Director of Engineering shall establish documentation and communication procedures for all**

activities of the *Program*.

- The Director of Engineering is responsible for all water systems and for communication and coordination among subgroups covering different portions of the *building water system* and associated equipment.

System Maintenance

- The *Program* documents shall include procedures for

Inspection of and inspection schedule for, water-containing vessels and system components; and

Flushing or mixing of stagnant or low-flow areas.

Implementation:

- Annually the Director of Engineering will assess the overall water systems in accordance with Legionella Standard 188.
    a) Director of Engineer will create potable and non-potable water systems on floor plan. The plan/ schematic/ list of building rooms will be all areas known that pose a dead leg scenario or traps that need filled.

b) Engineering will control setting limits in the building in accordance with References: Standard 188—Legionella: Risk Management for Building Water Systems (ANSI approved) ASHRAE Published 2015 & OSHA: Section II: C-1. Domestic Hot-Water Systems Technical Support and Emergency Management at (202) 693-2300.

c) All fixtures/sinks, lavatories, and showers heads, will be run for 1 minute. Director of Housekeeping will open all hot water valves and run water for 1 minute as set up on SQSS Task. Monthly a copy of the log will be reported to safety committee (monthly report added to yearly safety agenda).

The Director of Engineering will conduct a systematic analysis of *hazardous conditions* in the *building water systems. The areas to be reviewed and recommendations made are but not limited to:*

a) Two sinks in Zone 1

b) One sink in Zone 3

c) Two sinks in Zone 4

d) Two sinks in Zone 5

e) One sink in Zone 6

f) One sink in Zone 7

g) One sink in Zone 11

h) Two sinks in Zone 12

i) One sink in Zone 17

For domestic plumbing systems, **The Director of Engineering will verify that the hot water system is set at 140 degrees F. and deliver a minimum of 120 F. at the point of use.**

INTRODUCTION

Legionella is a type of bacteria that lives mostly in warm water with the highest risk for growth between 85F and 105F; however growth can occur between 78F and 120F. It is considered environmental bacteria that lives in and originates in water. Approximately 58 species of Legionellae have been isolated and identified to date in laboratories. The most common cases of illness attributable to legionella have been caused by a particular species called "Legionella pneumophila."

The illness caused by legionella is called legionellosis. Legionnaire's disease and Pontiac fever are common types of legionellosis. Legionnaire's disease attacks multiple systems within the Human body with a deadly type of pneumonia. Pontiac fever is a flu-like illness without pneumonia that may cause illness lasting several days but does not generally require hospitalization. The main concern is to prevent Hospital-acquired Legionnaires Disease which may cause serious illness or death due to legionella. In health care facilities, the concern extends to immuno-compromised patients who are much more susceptible to legionellosis.

PROCEDURE

Clinton Regional Hospital has developed a systematic approach for managing biological agents in the facility's water systems. The following procedures shall be followed:

1. Plan Management Team
    a. A multi-disciplinary team shall be established to implement and oversee the plan (Water Management Program Team). At a minimum, the team shall be comprised of the following members:
        - Director of Plant Operations/Facilities Management
        - Safety Officer
        - Infection Preventionist
        - Chief Nursing Officer or designee
        - Director/Manager of Environmental Services
        - Water Treatment Provider (if deemed necessary)
        - Legionella Risk Management Consultant (if deemed necessary)
    b. A Team chair shall be appointed and team members shall be documented on the Water Management Program Team form (Exhibit B). The team chair shall be a Senior Level Manager, Director or above.
    c. The Water Management Program Team shall meet quarterly to review the effectiveness of the plan (Exhibit D). More frequent meetings may be necessary upon implementing the plan and other factors such as major construction activities, outbreak response and overall plan performance.

2. Assessment
    a. A water flow diagram shall be developed for both potable and (non-potable) utility water systems to illustrate the various processes and related equipment. (Example Exhibit A). At a minimum, the following equipment shall be included on the respective flow diagrams:
        - Water Supply Sources - list location and name
        - Back Flow Preventers isolating non-potable water from potable
        - Fire Main and how it is separated from potable
        - Water Supply Service Entrances - list location and name
        - Central Filtration Systems including softeners (if applicable)
        - Cooling Towers and Evaporative Condensers
        - Domestic Water Storage Tanks
        - Ice & Beverage Machines - list if ice machine is ice only or ice and water dispenser
        - Drinking Fountains
        - Emergency Eyewash & Shower Equipment
        - Decorative Fountains and Other Water Features
        - Whirlpool Spas
        - Water heaters
        - Master Mixing Valves after water heaters
        - Every hot water return pump by name
        - Booster Pumps
        - Pressure Reducing Valves

    b. A water flow diagram is evaluated by the Water Management Program Team and equipment or processes determined to be at risk are established as control points.

    c. Established control points are documented on the Facility's Monitoring Plan "Water Management Program Monitoring Plan" (Exhibit C).

    d. Risk control methods are established and implemented for each identified control point using form EC.02.05.01.14.f. Water Management Program Hazard Assessment.

3. Equipment inventories are completed for all established control points and results are documented on related form EC.02.05.01.14.c-Water Management Program Control Point Inventories.

4. Maintenance & Housekeeping
    a. Routine Maintenance
        - Equipment maintenance procedures are developed and implemented for all equipment included on the Facility's water system diagram.
        - Maintenance activities are initiated by the Facility's computerized maintenance management system (CMMS).
        - Maintenance activities are carried out by trained staff or qualified vendors.
        - Documentation of all preventive maintenance activities are to be maintained on file in the Plant Operations/Facilities Management Department.

    b. Patient Room Inspections
        - Individual patient room inspections shall be conducted at least annually in accordance with policy EC.02.06.01- Maintaining a Safe, Functional Environment. Inspections are documented on EC.02.06.01.a - Patient Room Inspection Form which includes the following tasks:
            - Five minute flushing of both hot and cold water systems (showers and sinks).
            - Remove/disassemble shower head, and hose if applicable, and submerge in sanitizing solution (e.g. a 10% solution of bleach) for a minimum of 15 minutes.
            - Remove/disassemble faucet aerators and flow restrictors and submerge in sanitizing solution (e.g. a 10% solution of bleach) for a minimum of 15 minutes. Alternatively, faucet aerators and flow restrictors may be replaced annually.

    c. Inactive Rooms/Areas
        - Rooms/areas taken out of service or otherwise inactive for greater than 15 days (including construction projects) are subject to flushing of both hot and cold water systems (showers and sinks) every 15 days. Duration of flush shall be a minimum of

five minutes for each system and fixture.
- EC.02.06.01.a - Patient Room Inspection Form shall be completed for all inactive rooms prior to placing them back into service.

d. Housekeeping :
- Environmental Services staff shall perform the following on a periodic basis (e.g. weekly):
  - Ice Machines
    - o Surface cleaning
    - o Drain trough cleaning
  - Drinking Fountains
    - o Surface cleaning
    - o Drain trough cleaning
- Environmental Services staff shall perform the following in occupied rooms at a minimum of weekly and at room turnover:
  - Five-minute flushing of both hot and cold water systems (showers and sinks).
  - In rooms equipped with flexible shower hoses, hoses shall be left hanging downward to promote drainage.

5. Monitoring
   a. Monitoring methods are established and implemented for each control point included in the Monitoring Plan.
   b. Monitoring is performed at a frequency as detailed on log sheets.
   c. Additional monitoring may be necessary upon implementing the plan and other factors such as major construction activities, outbreak response and overall plan performance. Water Management Program Team members are to be involved in this process.
   d. Immediate actions are taken when monitoring results are unacceptable. Mitigation measures are outlined in EC.02.05.01.14.b.
   e. Monitoring results and any actions taken are documented on the Water Management Program Monitoring Plan (Exhibit C).
   f. The Monitoring Plan is reviewed by the Water Management Program Team at least quarterly or more frequently when needed.
6. Evaluation
   a. Overall plan effectiveness shall be evaluated in accordance with EC.02.05.01.14.a- Water Management Program - Validation.
7. Outbreak Response
   a. Outbreak response shall be in accordance with EC.02.05.01.14.b- Water Management Program - Mitigation and Remediation and in harmony with the Facility's Emergency Operations Plan (EOP). An outbreak response should be limited to a response when 1 confirmed case of hospital acquired Legionellosis or two or more cases of possible hospital acquired Legionellosis.
8. Other Considerations
   a. Disruptions in water service
      - Refer to policy "EC.02.05.01,10.b- Water Distribution System Failure".

   b. Construction
      - Newly constructed plumbing system and existing systems altered during renovation projects shall be designed to avoid dead-legs and low use drop legs.
      - Carbon-based water filters should be avoided whenever possible.
      - To avoid increasing water temperature, ice machine water filters should be installed at least 36" away from the ice machine served.

   b. Mandatory Training
      - Advanced Learning Center (ALC) modules shall be assigned and completed as shown in

the table below.

Module Number:	**FACMT-20201014**	**FACMT-20201015**	**FACMT-20201016**
Module Name:	**Water Management Program**	**Water Management Program- Validation**	**Water Management Program** - Mitigation and Remediation
Water Management Program Team Members	Annually	Annually	Annually
Facilities Management Supervisor Level & above	Annually	Annually	Annually
EVS Supervisor & above	Annually	Annually	Annually

9. Oversight and Review
    a. The following shall be reported to the Facility's Environment of Care Committee al least quarterly or as applicable.
        - Minutes from Water Management Program Team meetings
        - Monthly Monitoring results (Performed by members of the Water Management Program Team)
        - Monthly Water quality test results (Water Treatment Vendor)
        - Annual Validation Test
        - Mitigation and response activities
    b. The Water Management Program Team will review the plan and evaluate its effectiveness at least annually. This review shall be incorporated into the annual review of the Utilities Management Plan.

c. *The OSHA suggested guideline for Legionella Detectable Bacteria (LDB) in domestic hot- and tepid-water systems is less than 10 CFU per milliliter.*

If LDB concentrations are below 10 CFU per milliliter and no LDB were detected in swab or other samples, no further monitoring for LDB is necessary. Continue the maintenance program as long as the system is in use.

If water concentrations exceed 10 CFU per milliliter or LDB were detected in other samples, take steps to identify the source of contamination or amplification and treat the system.

Sample the water system monthly until the source of contamination is identified and adequately treated. Once LDB concentrations remain below 10 CFU for a three-month period, sampling may be stopped.

All pressure losses, water breaks, reports and activities shall be reported monthly to the Safety Committee by Director of Engineering. Reports will then be collected and provided to Safety Committee monthly. An Agenda Item is included on the yearly safety committee agenda.

References: Standard 188—Legionella:
Risk Management for Building Water Systems ASHRAE Published 2015
OSHA: **Section II:C-1. Domestic Hot-Water Systems** Technical Support and Emergency Management at (202) 693-2300.

Exhibit A

Potable Water Process Flow Diagram
Areas to Include

1. List all city water mains by name. Indicate; ;
    a. If they are all in use,
    b. If there are cross connection dead legs between mains or
    c. If separate mains are supplying separate areas in the hospital or
    d. If some mains are off and flushed on a routine basis.

2. Fire main
    a. Is it a separate feed from potable?
    b. If not, is it isolated from potable by BFP?

3. Media filters
    a. All media filters in potable water supply (main) such as whole house filters, softeners etc. must be identified and must have a plan for disinfection and maintenance.
    b. If carbon filters are used on ice machines it must be noted here. If not, this document should say no carbon filters in potable water.

4. Master Mixing Valves
    a. All water heaters should have a master mixing valve at outlet. This diagram should show;
        i. set point of water heater >140F
        ii. set point of hot water supply after master mixing valve, adjust to provide 120F water at POU
    b. As there is an issue with some CHS facilities not operating at proper water heater temperatures to comply with OSHA, CDC and ASHRAE requirements this document should emphasize the important of the master mixing valve and compliance with >140F temperature in water heater.
    c. If there is a softener it should typically only be on cold water supply to the hot water heater and not cold-water supply to the master mixing valve. This will result in some hardness getting into the hot water which is a good thing because zero hardness water is much more corrosive. Calcium is a natural corrosion inhibitor.

5. Hot water return is critically important and should be identified.
    a. If only one pump for building, then show one pump.
    b. If there are three hot water returns such as east wing, west wing and ED show all pumps and identify each hot water return. Often there is one hot water return pump somewhere in the ceiling that someone forgot. Failure of this forgotten pump has resulted in outbreaks. Failure of hot water return pumps even in mechanical rooms is a common cause of outbreaks because they are not monitored (temperature gage) and maintained.
    c. List minimum hot water return temperature control limit, typically no more than 10F loss from supply.
6. Hot and cold-water supply to building
    a. Is supply a series of risers or one riser and a series of headers?
    b. Are balancing valves at top of riser or end of header

7. Booster Pumps and Pressure Reducing Valves
    a. If booster pump what is boosted
        i. All cold water
        ii. Cold water to floors 2 or 3 and above
    b. Where are pressure reducing valves installed? An unbalanced system either because of plugged balancing valves or improperly set pressure reducing valves can cause issues with circulation.

1. Oversight and Review
    a. The following shall be reported to the Facility's Environment of Care Committee at least quarterly or as applicable.
        - Minutes from Water Management Program Team meetings
        - Monthly Monitoring results (Performed by members of the Water Management Program Team)
        - Monthly Water quality test results (Water Treatment Vendor)
        - Annual Validation Test (Performed by EMSL or SPL)
        - Mitigation and response activities
    b. The Water Management Program Team will review the plan and evaluate its effectiveness at least annually. This review shall be incorporated into the annual review of the Utilities Management Plan.

Exhibit A
Potable Water Process Flow Diagram
Areas to Include

1. List all city water mains by name. Indicate;
    a. If they are all in use,
    b. If there are cross connection dead legs between mains or
    c. If separate mains are supplying separate areas in the hospital or
    d. If some mains are off and flushed on a routine basis.

2. Fire main
    a. Is it a separate feed from potable?
    b. If not, is it isolated from potable by BFP?

3. Media filters
    a. All media filters in potable water supply (main) such as whole house filters, softeners etc. must be identified and must have a plan for disinfection and maintenance.
    b. If carbon filters are used on ice machines it must be noted here. If not, this document should say no carbon filters in potable water.

4. Master Mixing Valves
    a. All water heaters should have a master mixing valve at outlet. This diagram should show;
        i. setpoint of water heater >140F
        ii. setpoint of hot water supply after master mixing valve, adjust to provide 122F water at POU
    b. As there is an issue with some CHS facilities not operating at proper water heater temperatures to comply with OSHA, CDC and ASHRAE requirements this document should emphasize the important of the master mixing valve and compliance with >140F temperature in water heater.
    c. If there is a softener it should typically only be on cold water supply to the hot water heater and not cold-water supply to the master mixing valve. This will result in some hardness getting into the hot water which is a good thing because zero hardness water is much more corrosive. Calcium is a natural corrosion inhibitor.

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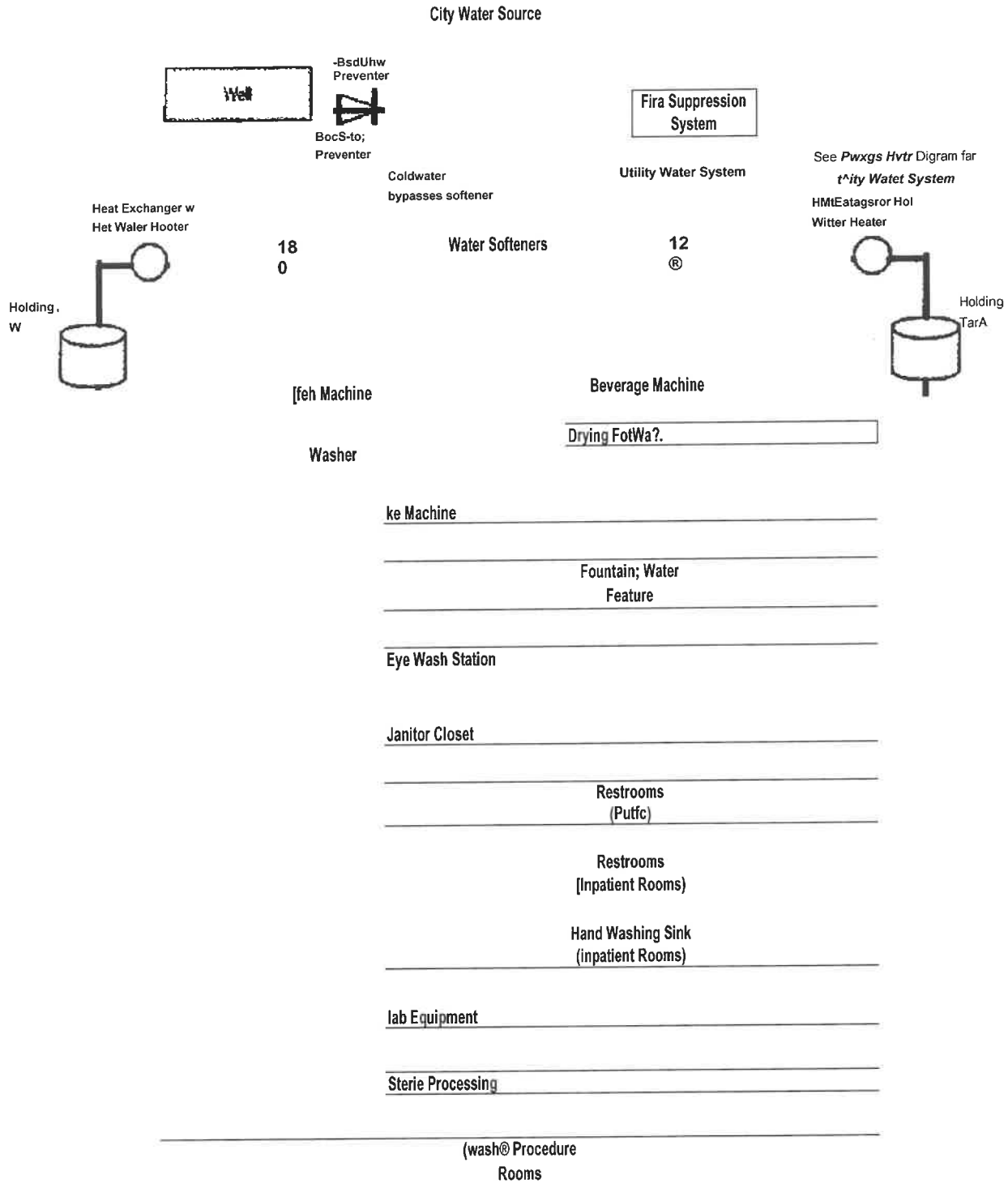
    c. List minimum hot water return temperature control limit, typically no more than 10F loss from supply.

6. Hot and cold-water supply to building

a. Is supply a series of risers or one riser and a series of headers.
b. Are balancing valves at top of riser or lend of header

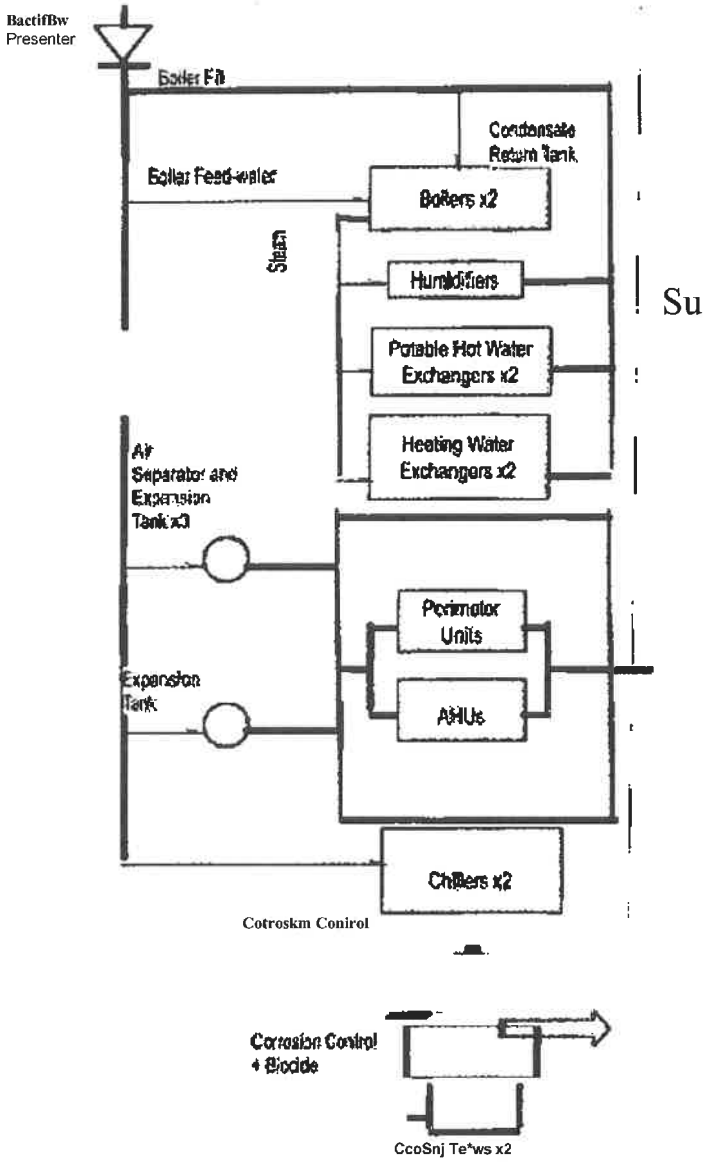
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    a. If booster pump what is boosted?
        i. All cold water
        ii. Cold water to floors 2 or 3 and above
    b. Where are pressure reducing valves installed? An unbalanced system either because of plugged balancing valves or improperly set pressure reducing valves can cause issues with circulation.

Example - Exhibit A
Process Flow Diagram - Potable Water System



Example - Exhibit A

Process Flow Diagram - Utility Water System



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Clinton Regional Hospital

Water Management Program Team

Exhibit B

Name	Title	Office Phone	Cell Phone	Home Phone	Email
	Team Chair (Director or above)				
Janice Merrill	Director of Plant Operations/Facilities Management	580-547-1258 Ext. 410	580-214-0345		janice.m@crhaok.com
Janice Merrill	Safety Officer	580-547-1258 Ext. 410	580-214-0345		janice.m@crhaok.com
Brenda Jennings	Infection Preventionist	580-547-1258 ext. 203	405-306-8176		brenda.j@crhaok.com.
Janae Chittum	Chief Nursing Officer or designee	580-547-1258 ext. 205			janae.c@crhaok.com
Janice Merrill	Director/Manager of Environmental Services	580-547-1258 Ext. 410	580-214-0345		janice.m@crhaok.com
	Other				
	Other				
	Other				

Water Management Program Monthly Monitoring Plan

Exhibit C

CP-ID	Equipment	Risk Control Method	Monitoring Method	Monitoring Results * | Inspected *(minimum of 3 when applicable)*	Monitoring Results Acceptable	Monitoring Results Unacceptable	Name & Date of Person Performing Inspection	Actions to take for Unacceptable Monitoring Results	Additional Comments
CP-1	Cooling Tower & Evaporative Condenser	Chemical water treatment & routine cleaning	Visually inspect towers and review water treatment records to ensure chemical levels are maintained at acceptable levels and no signs of algae/slime					Restore chemical levels to acceptable levels and re-inspect.	
CP-2	Domestic Hot Water Storage Tanks	Maintain domestic hot water storage tank(s) at temperature of 140F (degrees) or above.	Verify water temperatures readings on all domestic hot water storage tanks meet CDC, ASHRAE, OSHA recommendation of>140F					Restore tank temperature to acceptable levels and re-inspect.	
CP-3	Ice/Beverage Machines	Routine cleaning by EVS and quarterly sanitization by Facilities Management	Visual inspection of 10% of ice machine inventory to confirm effectiveness of cleaning and sanitization regimen.					Clean, sanitize and re-inspect.	

CP-ID	Equipment	Risk Control Method	Monitoring Method	Monitoring Results			Name & Date of Person Performing Inspection	Actions to take for Unacceptable Monitoring Results	Additional Comments
				Inspected *(minimum of 3 when applicable)*	Acceptable	Unacceptable			
CP-4	Decorative Fountains	Water treatment protocols	Review records to ensure chemical and other operational criteria are maintained at acceptable levels.					Restore chemicals to acceptable levels and re-inspect.	
CP-5	Whirlpool Spa: A whirlpool spa with a circulation system such as a birthing . tub is a risk that the circulation lines will become colonized. A hydrotherapy tub that has no piping. filters etc. and is completely drained and sanitized between use is not considered a risk.	Water treatment protocols	Review water-* treatment records to ensure chemical and other operational criteria are maintained at acceptable levels.					Restore chemicals to acceptable levels and re-inspect.	

CP-6	Pump - Water Booster		Confirm that hot water recirculating pump in running and inspect for. leaks.					Replace pump and/or repair leaks.	
CP-ID	**Equipment :**	**Risk Control Method**	**Monitoring Method**	**# Inspected** *(minimum of 3 when applicable)*	**Monitoring Results** **Acceptable**	**Unacceptable**	**Name & Date of Person Performing Inspection**	**Actions to take for Unacceptable Monitoring Results**	**Additional Comme**
CP-7	Hot Water Return Pump	-	Confirm that hot water recirculating pump in running and inspect for leaks.					Replace pump and/or repair leaks.	
CP-8	Master Mixing Valves on domestic hot water system(s)	Maintain water temperatures S14O°F (before mixing valve) 120°F after mixing valve.	Visual observation					Adjust, repair or replace failed mixing valve as needed	
CP-9	If no Master Mixing Valve, Maintain hot water temperature of 120'F at Point of Use. (POU).	Check water temperature at point of use with thermometer.	Visual observation					Adjust temperature settings, repair/replace thermostats as necessary.	

CP-10	Incoming Domestic Water disinfection levels	Maintain .2 to 2.0 ppm chlorine	Monthly Water Treatment Vendor tests					To provide control, disinfectant must be delivered through the point of use at an effective concentration, while also meeting drinking water standards.	
CP-ID	**Equipment**	**Risk Control Method**	**Monitoring Method**	**# Inspected** *(minimum of 3 when applicable)*	**Monitoring Results** **Acceptable**	**Unacceptable**	**Name & Date of Person Performing Inspection**	**Actions to take for Unacceptable Monitoring Results**	**Additional Comme**
CP-11	Facility Specific								
CP-12	Facility Specific								
CP-13	Facility Specific								
CP-14	Facility Specific								
CP-15	Facility Specific								
CP-16	Facility Specific								

1 hereby attest that the above functions were carried out in accordance with the Water Management Program

Water Management Program Committee Chair:	JomKZzHwill	pate		WaL
	Print Name	*W*	/)	Signature