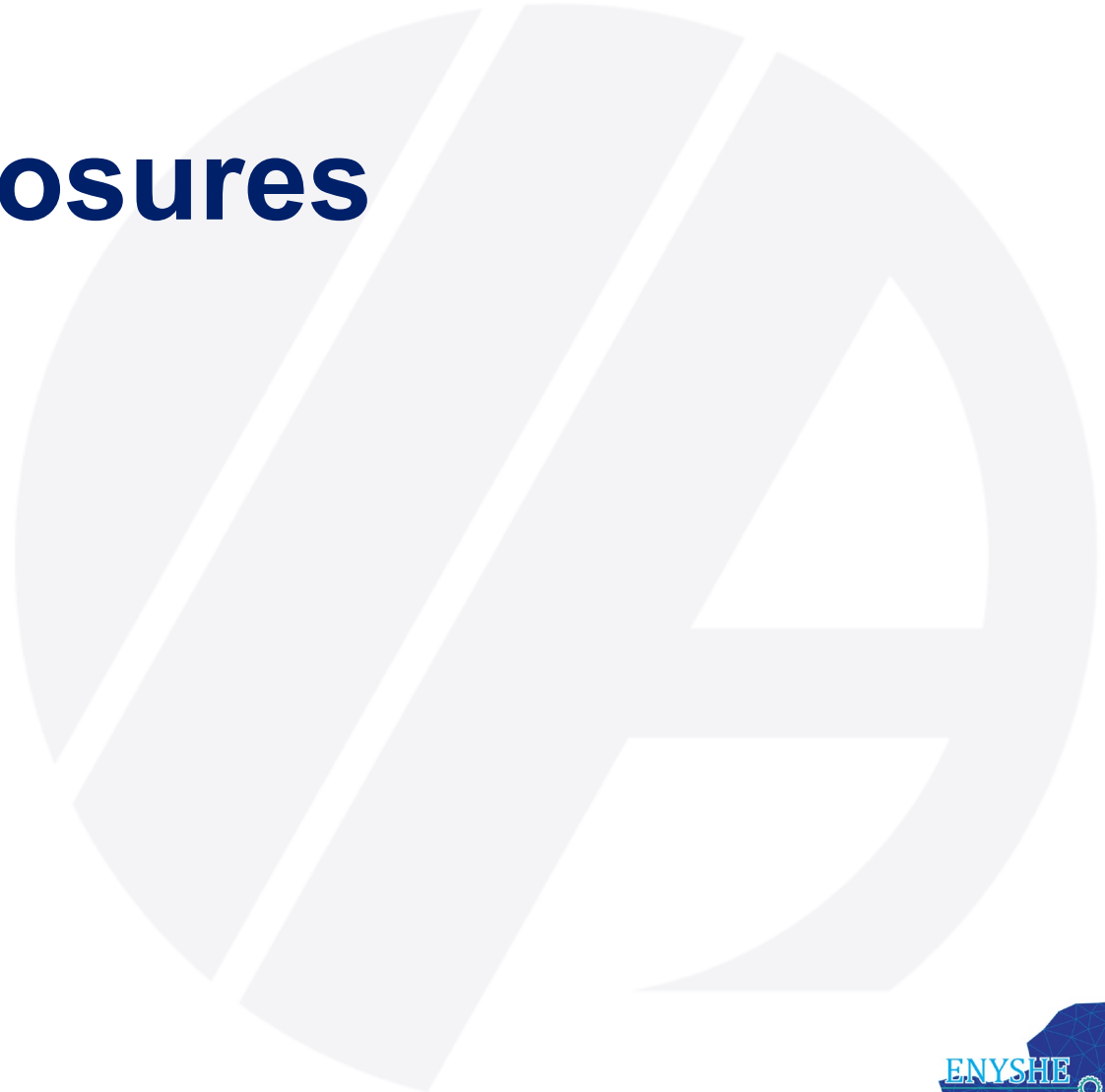


# **Safely Maintaining Normal Hospital Functions During a Boil Water Advisory: Risk Assessment, Communication, and After-Action Plan**

Jacqueline Cordell, MS, MT(ASCP)SM<sup>CM</sup>, CIC  
Jeffrey Casale, CHOP B  
Deidre Cirillo, RN

# No Financial Disclosures



# Learning Objectives



- Conduct a risk assessment for a healthcare facility in the event of a boil water advisory to provide potable water while safely continuing essential services
- Effectively communicate details of a boil water advisory event to staff and patients as needed
- Safely recommission appliances, plumbing fixtures and equipment after a boil water order is lifted
- Create an After-Action Plan and incorporate a boil water advisory event into Water/Emergency Management Plan

# Boil Water Advisory

**A Boil Water Advisory (BWA) is a form of communication used to mitigate health risks associated with contamination of municipal water.**

- Common events leading to a BWA
  - Loss of pressure in distribution system
  - Loss/disruption of treatment
  - Break in water line
  - Floods/natural disasters



Credit: Getty Images/iStockphoto



# Boil Water Advisory

## Risks of Using Contaminated Water

- Ineffective hand hygiene
- Disease outbreaks from pathogens such as *Giardia*, *Shigella*, *Campylobacter*, *norovirus*, *hepatitis A*
- Soft tissue infection



mywater



# Boil Water Advisory

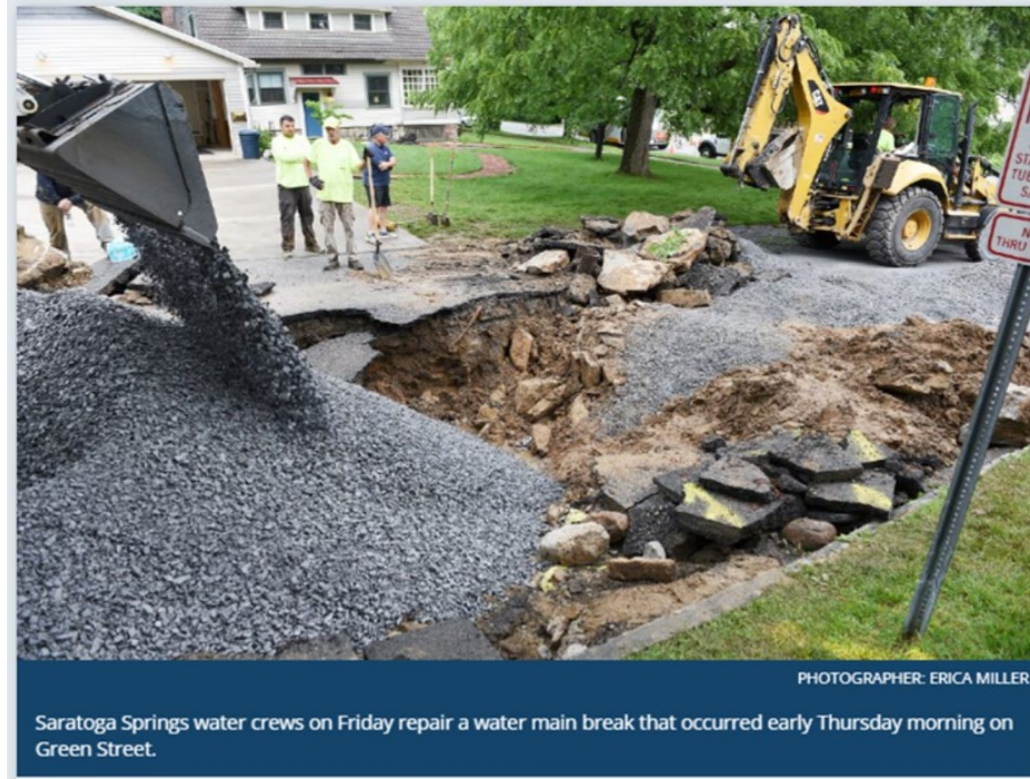
- Bring water to a rolling boil for a full 60 seconds
- Alternatively, bottled water



# Boil Water Advisory – Saratoga Springs, NY

Water Main Break July 1, 2021

- A 16-inch water main broke approximately one mile from the hospital around 3am
- New York State Department of Health (NYSDOH) issued a boil water advisory for entire city
- Nursing supervision notified via phone call at 20:59 that night
- Leadership immediately notified
- Email alert sent to staff “Code Brown – Water”
- Email sent to all staff notifying not to use water for consumption but allowed usage for hand hygiene based on a residential BWA checklist



The Daily Gazette 7/2/21: Saratoga Springs Businesses Scramble Against Boil Water Advisory



# What We Knew

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- Organization did not have a BWA protocol as part of Water Management Plan
- Only boiled or bottled water can be served to patients/staff
  - Consumption, oral hygiene
- Supply limitations: portable sinks, local community also buying bottled water

# Immediate Challenges

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- NYSDOH has a great [checklist](#) for **Hospitals and Resident Medical Facilities** under BWA (municipal water not to be used for hand hygiene without proper precautions)
- Many services in the organization could be affected
- Need to develop a plan to restore water use safely after cleared of BWA



# Identify the Risks in a BWA

## BOIL WATER NOTICES

### Checklist for Hospitals and Other Resident Medical Facilities

When a boil water event occurs at a hospital or other resident medical facility\*, there is a potential for exposure to water borne pathogens. Medical professionals must ensure that patients, staff, and the public are protected and must take every appropriate precaution to eliminate possible exposures. Listed below are actions that will help you to control exposures \*\*.

#### **Before a boil water event, review and update your emergency response plan:**

- Update contact lists for personnel and organizations.
- Use standard infection control practices and work with facility engineering and maintenance staff to identify all routes of exposure to tap water for patients, visitors and staff. Develop standard procedures to control these exposures.
- Identify all procedures, appliances, tanks, equipment, etc. that use tap water, especially where tap water is used for patient care, medical processes, sanitizing, preparing solutions, preparing food and beverages, etc.. If you provide any supplemental water treatment at your facility, discuss the adequacy of this treatment with your local Health Department.
- Prepare to meet your water needs. Determine in advance how much water you will need, where you will need it, how you will prepare it or where you will get it. Keep an emergency supply of bottled water on site.
- Develop standard procedures for restoring water use once the boil water event has been resolved. Medical facilities have unique equipment and complex plumbing that will require special attention for flushing and disinfection.

#### **During a boil water event, do not use tap water without appropriate precautions:**

- Check and follow your emergency response plan.
- The recommended treatment for tap water during a boil water event is to bring water to a full rolling boil for 1 minute, then cool before use. This may take 20-30 minutes, plan ahead.
- Do not use tap water for: drinking, mixing oral solutions, contact with open wounds or sores, internal treatment or contact within body cavities, patient rinsing, or hand washing. Use boiled water, bottled water, or water from a safe alternate source\*\*.
- Identify and control (shut off, bag or post signs) all locations where people can obtain tap water to ingest: water fountains, sinks, spigots, ice machines, etc. Provide drinking water (boiled or bottled) at convenient locations.
- If your facility provides food service, you must protect your patients, customers and staff from the exposures posed by this service. For additional details please refer to the handouts for Food Service Establishments.
- Provide boiled or bottled water in restrooms for patients, visitors, and staff. Although under ordinary circumstances alcohol-based hand sanitizers are an effective and acceptable method

of hand decontamination when hands are not visibly soiled, washing hands with soap (non-antimicrobial or antimicrobial) and clean, warm water is the preferred method for hand hygiene after using the restroom.

- Make sure patients and staff on all shifts are aware and understand what to do.
- Any ice made or mixed with ice made since the boil water event began should not be consumed. If age of ice is uncertain, label it unsafe for consumption and if it does not have a critical use, such as cooling medication or food, discard it. Disconnect the ice machine.
- Any solution or equipment prepared with water during or just prior to the boil water event should be evaluated before use.
- Adjust or eliminate procedures that are hard to perform with limited water. If appropriate, switch to an acceptable water treatment procedure or an acceptable alternate water supply\*\*.
- Also consider packaged ice from a safe alternate source.
- Some medical equipment provides additional treatment of tap water that may be sufficient to operate without boiling water, but many forms of water treatment may not provide adequate protection\*. Refer to manufacturer's specifications and consult with your local Health Department and your technical staff before relying on this treatment during a boil water event.
- Tap water can be used to wash floors and walls and to flush toilets, but should not be used for sanitary surfaces.
- Tap water can be used to wash clothes and linens, as long as they are completely dried with heat before being used.

**After the boil water event is over,** facility personnel must take appropriate steps to ensure that the facility water system, plumbing and equipment connected to it are all free of contamination. Some actions that will help you restore normal water use include:

- Flush **all** water lines. A general flushing recommendation is at least 15 minutes at each tap. Your facilities engineer should be able to advise you on a flushing time appropriate for the layout and complexity of your facility. Then wash sinks, fountains, faucets and spigots with a hospital grade disinfectant.
- Appliances, such as your water heater, water filters and water tanks, should also be flushed of at least one tank volume. Water filters should be replaced or have the filter media backwashed per the manufacturer's recommendations.
- All potentially affected equipment that uses tap water, such as your medical equipment, solution machines, beverage machines, dishwasher, and ice machines, should be flushed and disinfected per the manufacturer's recommendations. This should include dedicated water lines and tubing. Run equipment through a full cycle and flush contents to waste.
- Sanitary surfaces, patient contact surfaces, surfaces that will come into contact with utensils and medical tools, and ice bins should be cleaned with a hospital-grade disinfectant solution.

\* Boil water events may result from a boil water notice or advisory issued by a public water utility or from a boil water order issued by the local Health Department to a medical facility that runs its own water supply. A boil water event may also be initiated voluntarily by a medical facility in response to water quality concerns that arise at the facility. In the event of a "Do Not Use" order or notice, additional precautions will be needed. The information in this checklist is intended to help regulated facilities deal with boil water events, and does not revise or supercede any applicable regulations or permit requirements.

\*\* For additional information, including alternate water sources and alternate water treatments see the Frequently Asked Questions for Hospitals and Other Resident Medical Facilities or contact your local Health Department representative.



# Identify the Risks in a BWA

## BEFORE BWA

- ❌ Identify all procedures, appliances, tanks, equipment, etc. that use tap water, especially where tap water is used for patient care, medical processes, sanitizing, preparing solutions, preparing food and beverages, etc.. If you provide any supplemental water treatment at your facility, discuss the adequacy of this treatment with your local Health Department.
- ❌ Develop standard procedures for restoring water use once the boil water event has been resolved. Medical facilities have unique equipment and complex plumbing that will require special attention for flushing and disinfection.

## DURING BWA

- ❌ Do not use tap water for: drinking, mixing oral solutions, contact with open wounds or sores, internal treatment or contact within body cavities, patient rinsing, or hand washing. Use boiled water, bottled water, or water from a safe alternate source
- ❌ Make sure patients and staff on all shifts are aware and understand what to do.

## AFTER BWA

- ❌ Flush all water lines. A general flushing recommendation is at least 15 minutes at each tap. Your facilities engineer should be able to advise you on a flushing time appropriate for the layout and complexity of your facility. Then wash sinks, fountains, faucets and spigots with a hospital grade disinfectant.





## 5 Types of Risk Assessments:

- Qualitative
- Quantitative
- Generic
- Dynamic Risk
- Site-Specific

**Which Risk  
Assessment Would  
You Choose?**



## 5 Types of Risk Assessments:

- Qualitative
- Quantitative
  - Generic
- Dynamic Risk
- **Site-Specific**

- A **site-specific** risk assessment evaluates a distinct task(s) or activity.
- The **site-specific** assessment considers the unique aspects of the site location, environmental factors and the people involved.
- The **site-specific** risk assessment ensures that all potential risks in this situation are identified and addressed.
- A **site-specific** risk assessment may produce qualitative and quantitative data as well as looking beyond common hazards and incorporating unusual or unique factors specific to this event.

# Potential Risks Identified

- Hand Hygiene
  - Food and Nutrition Services (FANS)
  - Dialysis and Central Sterile Reprocessing (CSR) for High Level Disinfection (HLD) and Sterilization
  - Safely Resuming Water Usage
  - Communication
  - Inclusion in Emergency Response Plan (Step Action Plan did not follow guidelines consecutively)
- ... RISK ASSESSMENT using side-by-side analysis of pros and cons





## Arguments Against Tap Water for Hygiene

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- Use of tap water under BWA not indicated for handwashing in healthcare
- Contamination of hands
- Skin infection
- Lines/Devices
- Accidental ingestion while bathing

## Arguments Supporting Tap Water for Hygiene

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- Hospital monochloramine treatment of water
- Knowledge that hospital was not located in high-risk location
- Supply limitation of portable sinks and bottled water
- Handwashing with soap and water is **necessary** in some settings

# Risk Mitigation

## Hygiene with Tap Water

- Portable sinks to procedure areas for initial scrub in, foam scrub after
- Portable sinks to select units as available
  - Place patients with *C. difficile* on same unit with portable sink
  - If must use tap water for handwashing, follow with hand sanitizer
  - MHU protocols for hand sanitizer, educate patients to not ingest water while bathing (no open wounds)
- Bottled water for oral hygiene



## Arguments Against Tap Water for Food and Nutrition Services

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- Potable water required for:
  - Food handling
  - Washing produce
  - Consumption
- Concerns for utensils, plates, etc

## Arguments Supporting Tap Water for Food and Nutrition Services

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- Monochloramine treatment of water
- Supply limitation of portable sinks and bottled water
- Dishwashers obtain temps  $>160^{\circ}\text{F}$ , final sanitizing rinse





# Risk Mitigation

## Water for Consumption, Food and Nutrition Services

- Portable sink to the kitchen
- Serve bottled water to patients and staff
- Take all plumbed ice, water, and coffee machines out of service
- Continue use of dish washers
- Disposable plates/cutlery available



# Arguments Against Continuing Dialysis and CSR Services

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- Concern for equipment and instrument contamination
- Concern for infection associated with higher risk services

# Arguments Supporting Continuing Dialysis and CSR Services

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- Critical/life saving service lines
- Evaluated by contract dialysis company, following CDC recommendations
- Water for dialysis goes through ultrafilters and reverse osmosis (RO) filters with quality alarms
- Tap water in CSR goes through RO
- HLD is adequate for GI scopes, disinfected for microorganisms associated with fecal contamination, alcohol rinse
- CSR washers 180°F, steam sterilizers 270°F

# Risk Mitigation

## Continuing Dialysis and CSR Services

- Discontinue dialysis if water quality alarm is activated
- Collect cultures
- Disinfect dialysis system
- Disinfect system (again) if rise in culture levels (there wasn't)
- Continue normal CSR services



## Arguments Against Post-BWA Normal Water Usage

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- Recommendation to flush all water lines
- Plumbed machines (ice, coffee) cannot be used until cleaned
- Out of replacement filters for coffee and ice machines

## Arguments Supporting Post-BWA Normal Water Usage

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- Due to high level monochloramine filtration system, low concern for actual contamination
- All surfaces are routinely cleaned with hospital grade disinfectant solution
- Staffing limitations



# Risk Mitigation

## Return to Normal Water Usage Post Boil Water Event

- Sinks in sterile areas and vulnerable population units to be flushed for 15 minutes
- OR and sterile area sinks/faucets to be washed immediately, other sinks washed as part of routine cleaning
- Flush and disinfect dialysis equipment
- Flushing and cleaning of plumbed fixtures to occur on priority basis
- Remove water filters from plumbed coffee and ice machines and replace when available



# Communicating Risk Mitigation



- Signage on plumbed water dispensers (coffee makers, water fountains, ice machines)
- Sent revised email regarding hand hygiene
- Phone conversations between Facilities, Infection Prevention and Regulatory
- Phone conversations with directors of affected service lines
- Email of completed Risk Assessment to relevant stake holders
- In-person education of patients being discharged to residence in Saratoga Springs by nursing

Per New York State  
Department of Health,  
tap water should not be used  
for handwashing and patient  
rinsing at this time.

Please use hand sanitizer or  
bottled water.

If your department/unit is in need of hand sanitizer or bottled water,  
please contact Environmental Services at Ext 8272.

# After-Action Report



## Conclusion of BWA event, Hot Wash Discussions, Collaborative Review

### The After-Action Report:

- Purpose Statement: Summary of the purpose of the After-Action Report
- Event Overview: Overview of the BWA, sites affected, impact, and duration
- Objectives: Goals listed
- Preliminary Findings: Initial assessment
- Participants
- **Major Strengths**
- **Opportunities for Improvement**
- Conclusion



# After-Action Report – Major Strengths



- **Existing stockpile on-site and the use of the contracted service for bottled water was successful**
  - Involved several large quantity deliveries of water
- **There were no adverse events related to infection control**
  - Increased monitoring and use of alternatives to tap water.
- **A lower-than-normal census (holiday weekend) in our favor**
- **All departments worked together to provide service to our patients and staff**
  - Communication updates were timely and addressed concerns of staff and patients.
  - After the order was lifted, a team was dedicated to recommissioning plumbed equipment





# After-Action Report – Major Strengths



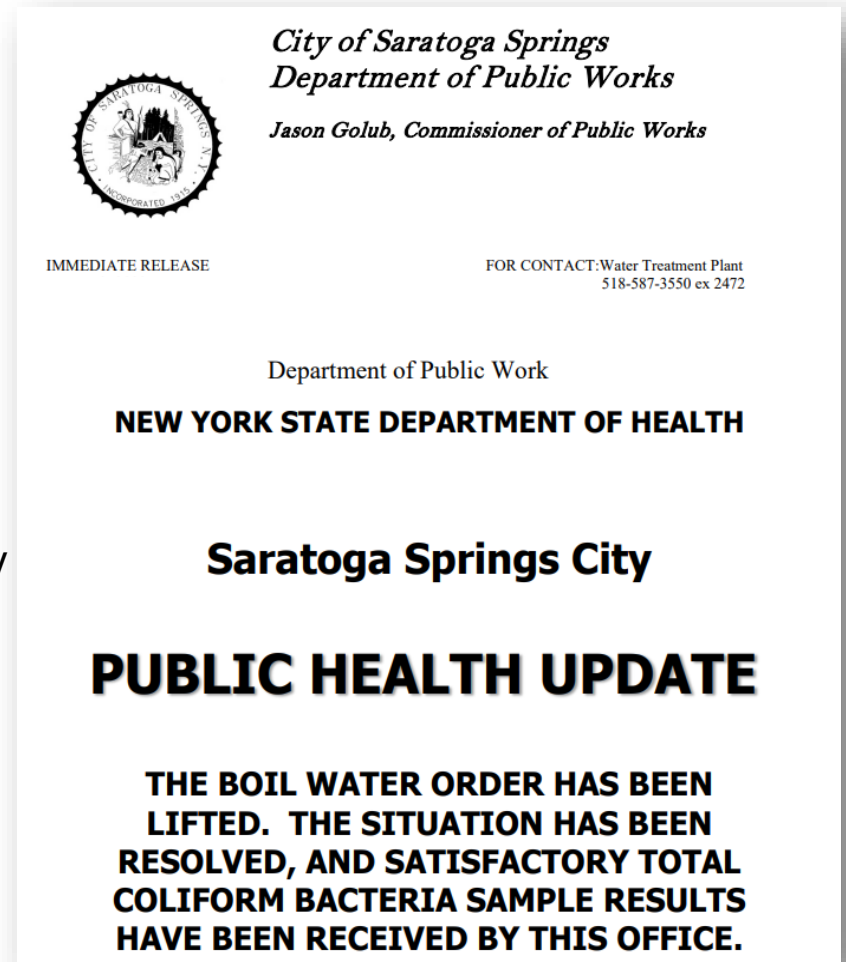
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# After Action Plan – Opportunities for Improvement



- **Incident command (IC) should have been more formally established**
  - While there was an overall incident commander who regularly updated administration, a formal IC structure could have improved delegation of authority, command and communication, thus providing reassurance to staff
- **Mass notification system (MNS) could have been used to update staff on the progress of the event**
  - Email and phones were used effectively, however the use of the MNS may have reached more employees who did not have access to email (i.e., those not at work).
  - Media and the City of Saratoga Springs also provided messaging to reach the general public and businesses affected – confusion and water usage prior to hospital recommissioning occurred
- **Purchase and stock additional ice machine filters**
  - Readily able to source but keeping in stock would improve turnaround time getting back into service



# Act II: Applying What We Learned



Times Union: Saratoga Springs water main break causes boil water advisory. Jan 1, 2023. Photo Provided/Jason Golub



# January 1, 2023



- Water main break New Year's Day 1.5 miles from the hospital
- Loss of water pressure caused there to be **NO WATER** at the hospital
- Code Brown called
- Formal Incident Command Established (Chief Medical Officer)
- After about two hours, the water service returned
- Boil Water Advisory issued for the entire city for 48 hours
- Reviewed the 2021 BWA Risk Assessment and After-Action Plan with Incident Command



Repair crews worked to fix this water main break in Saratoga Springs.  
(Saratoga DPW)



# No Water – Risks Identified



- **Flushing toilets**
  - Mitigation: 5-gallon Buckets filled with residual water in plumbing



# No Water – Risks Identified



- **Dialysis**
  - Mitigation: Non-issue in this case (Sunday, Holiday)
    - Otherwise, would require collaboration within Albany Med Health System
- **CSR/HLD**
  - Mitigation: Non-issue in this case (Sunday, Holiday, no active surgery at the time)
    - Otherwise, would require collaboration within Albany Med Health System or other sites within the organization where CSR takes place
- **Environmental Services**
  - Mitigation: Chemical bottles filled at an unaffected site

# Boil Water- Additional Risks Identified



## Environmental Services

- Water under BWA may be used for cleaning floors but not clinical surfaces
  - Mitigation: Wilton Medical site not under BWA, dispensers at that site used to dilute concentrated daily cleaning product and bring back to hospital site

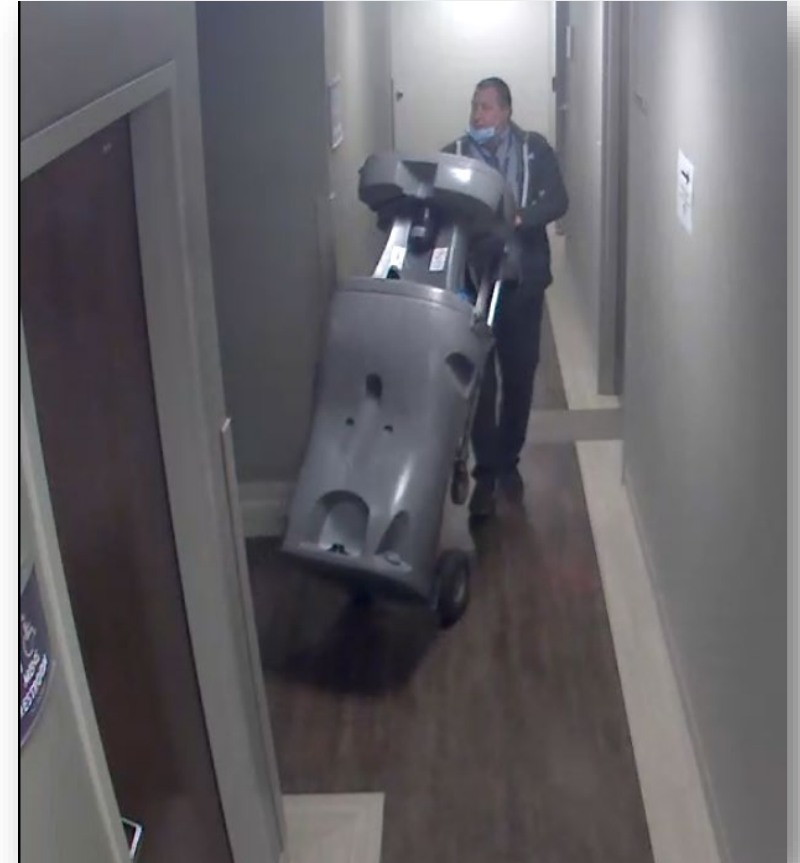


# Boil Water- Additional Risks Identified



## Off Site Outpatient Practices (Open 2<sup>nd</sup> Day of BWA)

- Urology
  - Mitigation: Bottled water jugs supplied for reprocessing scopes
- Sleep Lab
  - Mitigation: Enough disposable equipment, no reprocessing needed
- Dental
  - Mitigation:
    - Portable handwashing unit provided
    - 12 gallons of distilled water provided for use in procedures







## A third scenario was added to Emergency Water Plan

1. Loss of Water to Facility, no BWA
2. No Loss of Water to Facility; BWA issued – minimum 48 hours response
3. Loss of Water followed by BWA on restoration – minimum 48 hours response

# Opportunities for Improvement



- Need to include BWA in Hazard Vulnerability Assessment
- Should review the plan and actions with an expert from the Department of Health
- Investigate potential use of underground aquifer for secondary means of water for plant operations (water reclamation study)
- An alternative plan for onsite dilution of cleaning product
- Manage large bottled water inventory
- Locate ice distributor
- Acquire additional handwashing units and storage
- Supply 5-gallon buckets to offsites for toilet flushing
- Food and Nutrition Services to evaluate loss of water plan and supplies (COFFEE)



**The Past Is Behind, Learn From It. The Future Is Ahead, Prepare For It.**



# The Past Is Behind, Learn From It. The Future Is Ahead, Prepare For It.



**CLEANING UP** — Saratoga Springs city employees work outside of the Adirondack Trust Building on Broadway Wednesday to correct problems caused by an early morning water main break.

Times Union photo by Skip Dickstein

## Saratoga Springs leak

### Water main break floods business district

By Ken Thurman  
Staff writer

SARATOGA SPRINGS — A water main break along Broadway early Wednesday left downtown businesses temporarily without water and forced the city's main thoroughfare to close for more than 24 hours.

The problem occurred about 3:30 a.m. when three sections of an eight-inch water distribution line split open spewing water from beneath the pavement. The stream was a foot deep along the curbs and sidewalks if Broadway for a time, city officials said.

Pressure created by the water's escape to the surface also caused a gaping hole at the point of the break and cracks along a 150-foot stretch of Broadway.

Broadway between Division and Church streets was closed to traffic Wednesday and is expected to

remain closed today, city police said. Water service to 25 to 30 businesses along Broadway was shut off for about seven hours late Wednesday afternoon while more immediate repairs were being done.

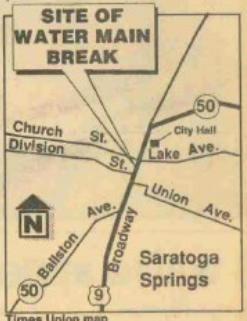
"I've never seen anything like it. This type of break is highly unusual," said Joseph Neal, the city's director of public works. Breaks usually occur in one spot, but in this case the entire length of the piping split open on its side, he said.

Public Works Commissioner Thomas McTygus said the break was probably caused by a water valve improperly left closed. The closed valve prevented water from moving freely and it eventually froze, causing the pipe to burst, he said. The valve may have been left closed by a contractor working on a sewer line in the area two years ago, McTygus said.

Neal said once all the pipes are replaced, work

See **BREAK** / B-13

*7/11/90*



Times Union map  
**Broadway will be closed between Church, and Division Streets**



# Opportunities for Improvement Facilities Tips:



- **Monitor your Water pressure via CMMS**
- **Have a way to collect water for toilet flushing, low point drain in Boiler room and a supply 5-gallon buckets**
- **Have a checklist for equipment affected by loss of Water**
- **Have Emergency connection for your Steam Plant and Chilled Water**
- **Know your DPW contact for hospital and any other municipalities you may have facilities located in.**
- **Bottled Drinking water**

Metasys - Events

Name: DOMWTR.H2O-PSI  
Status: Low Alarm

Date: 10/4/2023, 09:59:24 AM Priority: 70  
Value: 0.0 psi

Description:  
Dom Water Supply Pressure

Alarm Message Text:  
DOMWTR Dom Water Supply Pressure Out Of Limit

Ack  
Snooze  
Discard  
Snooze All  
Pending Acks: 1  
View Item

Metasys >

(Metasys Alarm)  
DOMWTR.H2O-PSI  
10/4/2023 9:55:39 AM  
Low Alarm

Message:  
DOMWTR Dom Water Supply Pressure Out Of Limit

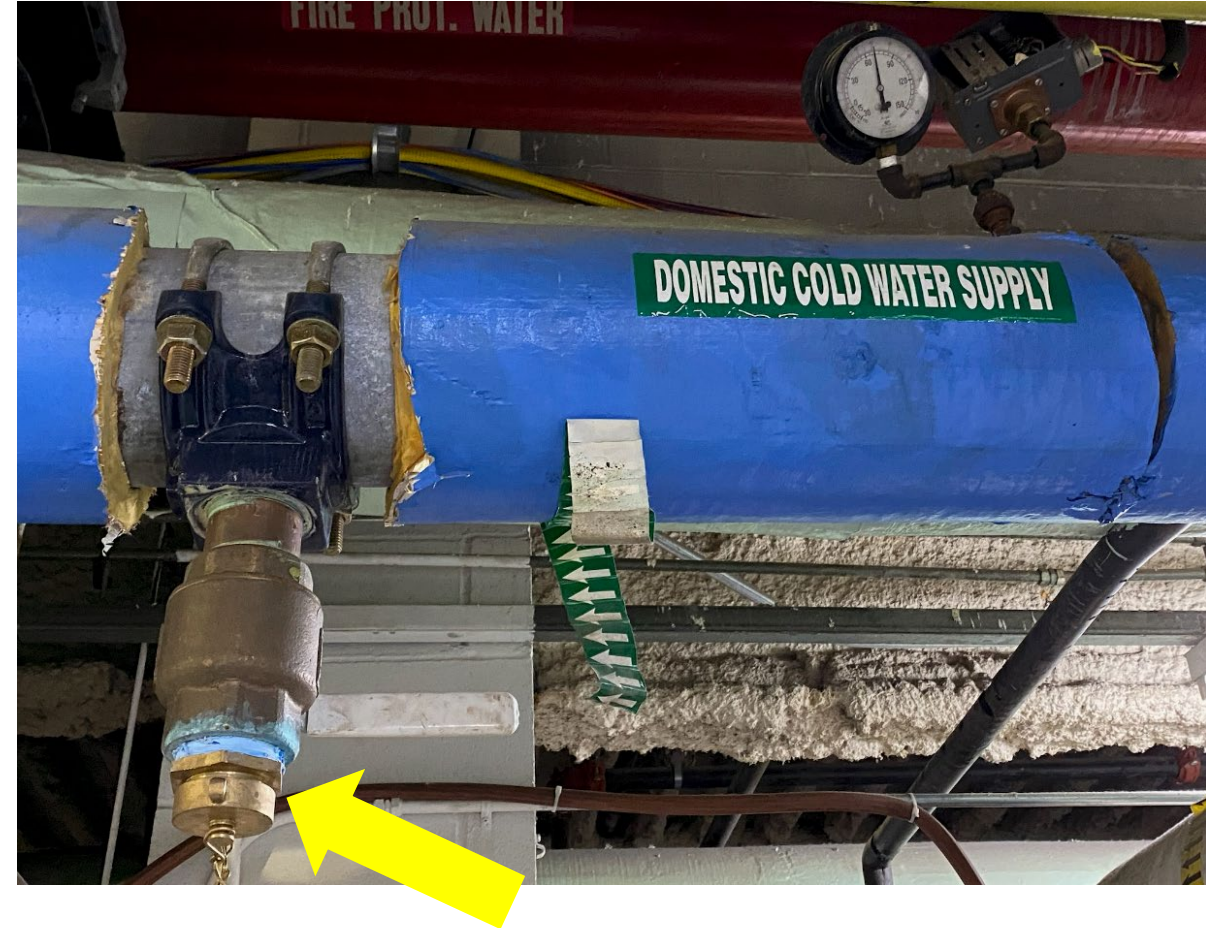
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EQUIPMENT TO BE TURNED OFF DUE TO LOSS OF CITY WATER

Equipment	Location	Procedure	Power Location	Priority
STEAM PLANT	BOILER ROOM	MONITOR WATER LEVEL IN SURGE AND D.A. TANKS, IF POSSIBLE LOWER STEAM PRESSURE SETPOINT IN <del>Metaxys</del> TO CONSERVE WATER USAGE. SHUT BOILER'S DOWN BEFORE TANKS RUN DRY. SECURE BOILER BLOWDOWN VALVES.	BOILER ROOM	HIGH
DOMESTIC WATER BOOSTER SYSTEM	BOILER ROOM	PRESS ON/OFF BUTTON	BOILER ROOM	HIGH
REFRIGERATION COMPRESSORS	DIETARY	TURN "OFF" DISCONNECTS COMPRESSORS 2,3,4,6,7,8 UNIT WILL MAINTAIN TEMPERATURE FOR ABOUT 2 HOURS WITHOUT COOLING	COMPRESSOR ROOM 500' OF HOSE NEEDED TO GET TO WHITE HOUSE	HIGH
MORGUE COMPRESSORS	MORGUE	TURN "OFF" DISCONNECTS * UNIT WILL MAINTAIN TEMPERATURE FOR ABOUT 2 HOURS WITHOUT COOLING	MORGUE PANEL: BREAKER:	HIGH
MANITOWOC ICE MACHINE	DIETARY	TURN "OFF" BREAKER	LG-1 34 & 36 NEXT TO ENTRANCE OF CAFE.	LOW
ICE MACHINES	CATH LAB, C1, D1, D2, D3, C2, PACU, C3, A3, ED, LAB	TURN "OFF" WATER VALVES	UNPLUG UNITS	LOW
SPACE COOLER	ULTRASOUND 1	TURN "OFF" BREAKER	1LL1 38 & 40 XRAY ELEC. ROOM	LOW
	ULTRASOUND 2	TURN "OFF" BREAKER	1LL2 #2 XRAY ELEC. ROOM	LOW
	NUCLEAR MED 1	TURN "OFF" BREAKER	1GL2 16 & 18 XRAY ELEC. ROOM	LOW
	NUCLEAR MED 2	TURN "OFF" BREAKER	1LL1 8 & 10 XRAY ELEC. ROOM	LOW

# Opportunities for Improvement Facilities Tips:



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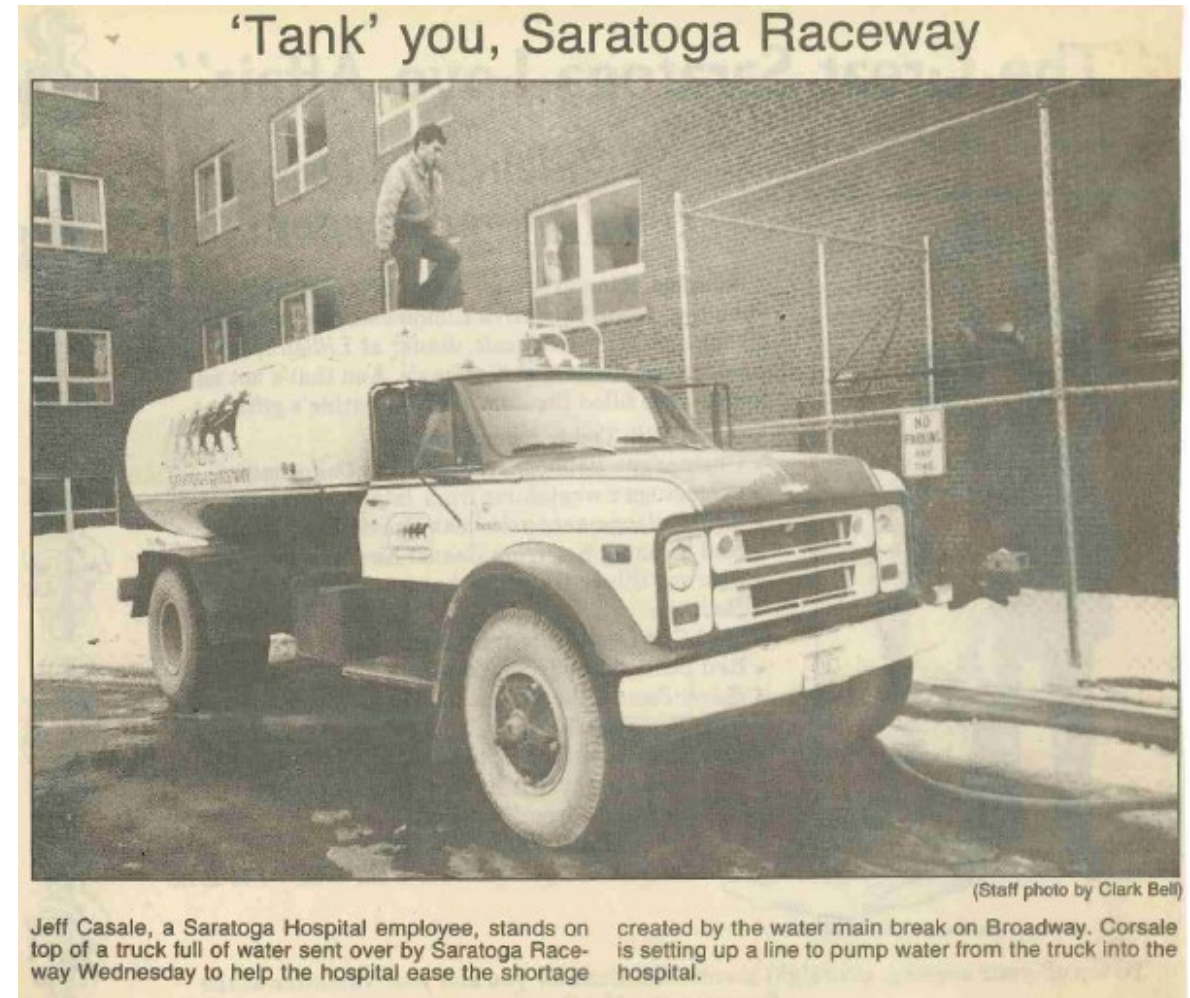




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**SARATOGA  
SPRINGS | NY**

# Opportunities for Improvement Facilities Tips:



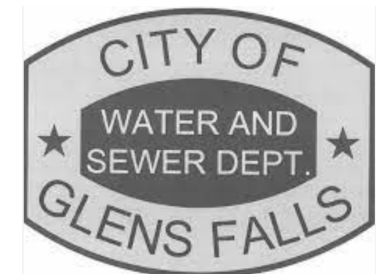
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**SARATOGA  
SPRINGS** | NY



Town of  
**WILTON**  
New York



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# Conclusions

**Water, water everywhere, but not a drop to wash our hands with...**



- Prepare in advance and review DOH guidelines for BWA in healthcare facilities. Include BWA in Hazard Vulnerability Analysis and Water Management Plan



- Assess risks for all services provided with municipal water and mitigate risks while engaging with stakeholders from all applicable service lines



- Ongoing communication is imperative throughout a BWA in a healthcare facility and when the advisory is lifted. Complete and share After-Action Plan



# Conclusions

Facilities IP Collaboration March 8 2024 ENYSHE / APIC Meeting



# Acknowledgements

## Special Thanks To

- Susan Armer & SH Supply Chain
- Toni Bishop-McWain
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- Amy Campbell
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# Questions?

