

Update on Improvements to Water Treatment Facilities

Project # 08-028

Newport City Council Workshop

April 5, 2010

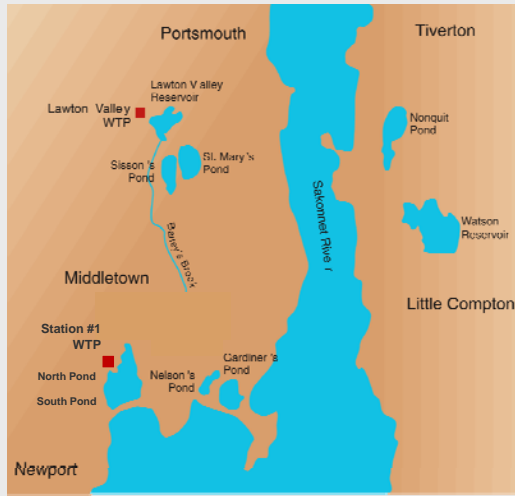


Workshop Agenda

- **Purpose:**
 - Provide a progress update
 - Focused discussion on control of THMs
- **Present and discuss:**
 - Water quality challenges with Newport system
 - Comprehensive plan for Newport WTPs
 - THM control options
 - Rationale for moving forward with advanced treatment option

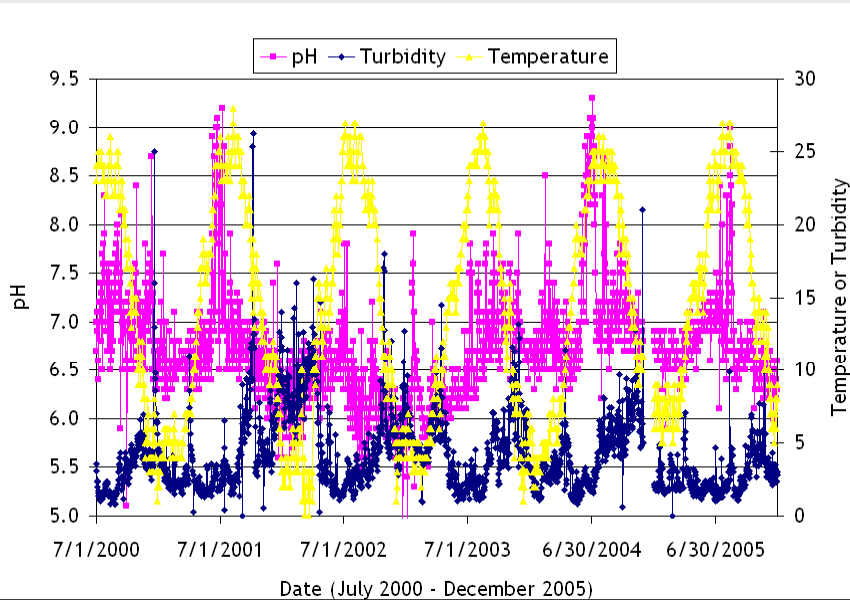
Brief Background

- **Two plants**
 - Lawton Valley
 - Station 1
- **Nine reservoirs**
 - Extremely variable and very difficult to treat
 - Creates serious plant design / operations risk
- **Highly unusual and unexpected type of pipe scales (tetraivalent lead or Pb(IV)) in the distribution system**



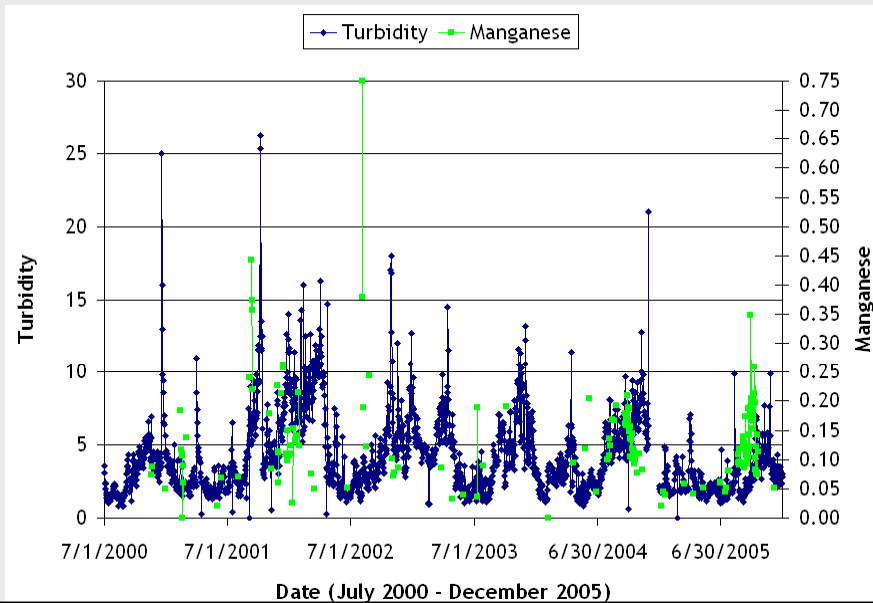
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Day-to-Day Water Quality Variability Increases Operational Challenges (1 of 2)



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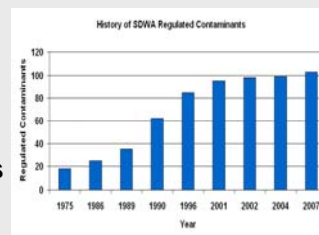
Day-to-Day Water Quality Variability Increases Operational Challenges (2 of 2)



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In 2004, Comprehensive Plan Prepared to Address Water Treatment Needs

- Significant increase in new drinking water regulations since late 1980s and more on the horizon
- Detailed evaluation of both treatment plants
- Most significant issue: new regulations for THMs (*trihalomethanes*)
 - Change compliance from system-wide average to individual site average
- Proactive, 20-year comprehensive plan:
 - Replace Lawton Valley WTP with a new plant
 - Upgrade Station 1 WTP to regain original capacity of 9 mgd (currently limited to 6 mgd)
 - Evaluate chloramines for short-term reduction in THMs as well as part of long-term plan



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Progress Update of Key Activities

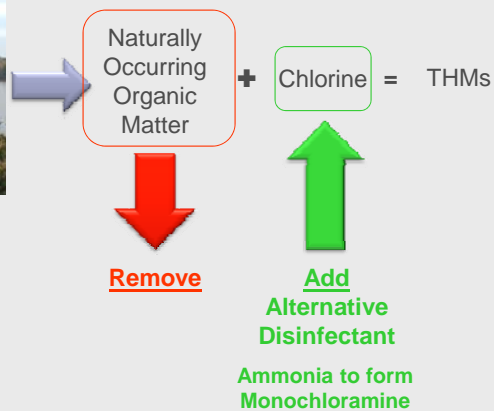
- Consent agreements with RIDOH and RIDEM
- \$57 million estimated cost to:
 - Replace Lawton Valley WTP with a new plant
 - Upgrade Station 1 WTP to regain original capacity of 9 mgd (currently limited to 6 mgd)
 - Conventional treatment
- Phase 1 City Advisor: Design-Build delivery
- Pipe loop testing for chloramines
- Pilot testing of alternative treatment processes

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Overview of How THMs Are Formed and Controlled



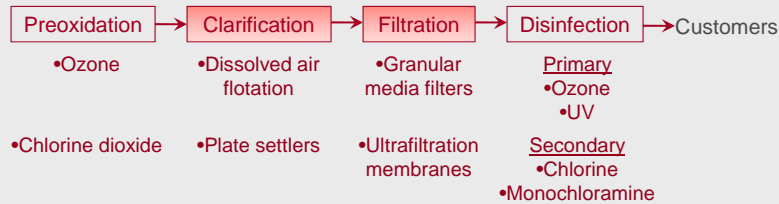
Water Supply Reservoir



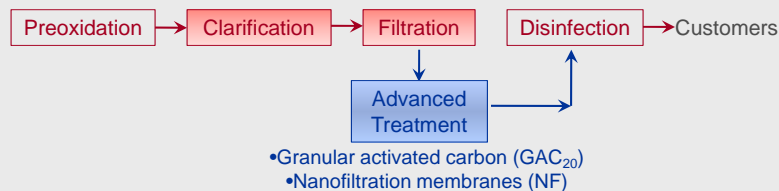
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Options for Removing Organics

■ “Conventional” treatment



■ “Advanced” treatment



■ Pilot testing study (March – November 2009)

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Options for Adding an Alternative Disinfectant

■ Chlorine dioxide

- Limited because of its own byproducts (*chlorite*)

■ Ozone

- Does not maintain a residual through the system

■ Monochloramine

- Chlorine + Ammonia = Monochloramine
- Little guidance available in the literature on how to deal with Pb(IV); highly complex technical issue
- Pipe loop study to evaluate impact on lead because of unique and usual scale (Pb(IV))

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Other Alternatives

- **Aeration**
 - Form THMs, then use air stripping to remove
- **Localized treatment at wholesale customer meter(s)**
 - Option only for Portsmouth
- **Desalination**
- **Remove all lead service lines in Newport**
 - Full replacement, including homeowner portion, required to eliminate risk
 - Sources of lead still present in homes (e.g., faucets, valves, etc.)

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Removing Organics: Pilot Testing Findings

- **Multiple seasons, March 2009 – February 2010**
- **“Conventional” treatment**
 - Not enough by itself
- **Advanced treatment**
 - GAC: better removal, but not sufficiently reliable
 - NF: excellent removal (more than enough)



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Nanofiltration (NF)



- Effectiveness for controlling THMs: very good
 - More organics removal than needed if all of the flow is treated
- Can utilize “split” treatment
 - Only treat a portion of the flow, then blend with conventionally treated water
 - Approximately 55 to 65% treated by NF
 - Saves cost
- More complex; very sensitive to upstream conditions and O&M practices

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Adding an Alternative Disinfectant (Monochloramine): Pipe Loop Findings

- Effectiveness for controlling THMs: very good
- Impact on lead
 - Not known yet; 6 – 12 months additional pipe loop testing
 - Likely to require adding another treatment chemical (orthophosphate)
 - Uncertainty in the science; cutting edge...
 - Limitation in not being able to test actual pipes in service



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Removing Organics: Other Factors Regarding Nanofiltration



- Complexity of operations
- Residuals (concentrate) disposal
- High cost
 - Capital
 - Operation and maintenance (O&M)
- Modular/expandable/flexible
- Ability to address future regulations, emerging contaminants
 - Endocrine disruptors; pharmaceutical & personal care products
 - Unregulated pathogens
 - Pesticides

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Adding an Alternative Disinfectant: Other Factors Regarding Monochloramine (1 of 2)



- Requires adding two more chemicals
 - Ammonia
 - Orthophosphate (most likely)
- Unregulated byproducts may be regulated in the future
 - Most concern is NDMA (N-nitrosodimethylamine)
 - Classified as a probable human carcinogen by EPA
- Low cost
 - Capital
 - O&M

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Adding an Alternative Disinfectant: Other Factors Regarding Monochloramine (2 of 2)



- **Nitrification**
 - If not properly controlled, consequences can include:
 - Rapid biofilm growth (jeopardizing compliance with coliform regulations)
 - pH depression
 - Increased nitrite and nitrate levels
- **Public perception, concerns, reaction**

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Monochloramine Public Concerns

- **Has been used in drinking water for 90 years; approved by EPA and widely used across the US**
 - Los Angeles, San Francisco, Boston, New Bedford, many others
- **Will need to be removed for fish and amphibian use, and for people or businesses requiring highly treated water (e.g., dialysis patients)**
- **Some individuals and groups have expressed concerns about the amount of information available about health issues associated with monochloramine**
- **Reported adverse effects such as respiratory symptoms, skin rashes and digestive disturbances**

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REPORT YOUR SYMPTOMS

If you live in the CWD and believe you have water-related symptoms, VCE recommends you take the following steps:

- Talk to your doctor or care provider(s), and be sure to let them you think your symptoms may be related to the water. If you are using lotions, steroid creams, or other "allergy"-type medications for the first time or more often, it may be the water causing your symptoms.

• Contact the [Verified Contact of Health](http://www.vce.org) at 800-445-4374.

• Contact VCE at 800-229-4281 or by email at vce@vermont.edu. We are compiling reports to look for patterns and trends. There are no studies on skin or respiratory effects of chloramine, and the limited studies on cancer are inadequate for assessment. Contact the EPA at epa.gov.

WHAT YOU CAN DO ABOUT CHLORAMINE

1. Call VCE at 229-4281 and document your story.
2. Tell your doctor and express your concern.
3. Tell decision-makers your concerns:
 - CWD Manager Jim Fay 864-7454
 - Health Commissioner Wendy Davis 863-7280
 - ANR Secretary Jonathan Wood 241-3600
 - Your town's CWD Commissioner*
 - Your legislators State House 800-722-5616
 - Governor Jim Douglas 802-828-3333

*Champlain Water District Board of Water Commissioners

South Burlington
Peter A. Jacob, Chair 802-878-4546, Alternate: Wilson Taylor
Winooski
Tom Bessette, Vice Chair 805-5111, Alternate: Paul Borne, Manager Town of Shelburne
Colchester
Karen Richmond 264-7523, Alternate: Al Viegas 264-7571, Manager Town of Colchester
Waterbury
George Heaton 895-4222, Alternate: Andrew Legg 895-4954
Winooski
Peter Drivak 855-9167, Alternate: Joshua Handwerker 855-0410, Manager
Essex
Bernie Leonard 278-0183, Alternate: Ruth Taylor
Winooski

Chloramine = Chlorine + Ammonia

LIMIT YOUR EXPOSURE


There is no easy way to effectively filter out chloramine from household water. Some people have found that whole house filters help, but they are expensive and require maintenance.

By limiting exposure - taking shorter, cooler showers, showering elsewhere, using spring water for bathing, cooking and cleaning - almost all who suffer from symptoms see fast relief.


Contact VCE for other suggestions on how to cut back on your contact

The CCAC Flier

Is your tap water safe?



Did you know that a new disinfectant, **chloramine**, has been added to our Hetch Hetchy water system which has not been properly tested for human consumption and safety?



care2 petition site

CHLORAMINE Fish Can't Live With It.

STOP USE OF CHLORAMINE IN DRINKING WATER!

Target: Use Chlorine, U.S.E.A.

Sponsored by: Chloramine Information Center

Water companies across the US are adding ammonia to your drinking water. Ammonia and chlorine combine to make a compound called "chloramine". It is lethal to fish. Six massive fish kills have been documented in the US and Canada killing everything down to the earthworms. People in 20 states have reported respiratory problems, skin rashes and digestive problems from drinking, cooking with or bathing in chloraminated water. The byproducts of chloramine are 100 TIMES MORE TOXIC than those of chlorine. These byproducts are known to be genotoxic (damage DNA), cytotoxic (damage cells) and carcinogenic (cause cancer). Chloramine is 20,000 TIMES LESS EFFECTIVE in killing bacteria that cause water borne diseases. Chloramine literally "wets" rubber fitting in plumbing and leaches lead into your children's water. Lead poisoning can cause developmental disabilities in children. The use of chloramine adds pollutants to the Chesapeake Bay and other watersheds that are destroying these water bodies. There are alternative methods available to these water companies. They do not have to use chloramine. It is the cheapest alternative available to them. Scientists have no doubt that EPA will eventually regulate chloramine byproducts. That time frame could be 5-15 years. In the meantime the water companies have said they will use it until someone makes them stop! Your signature will help make them stop. To learn more about chloramine and the fight to stop its use go to <http://www.chloraminecenter.net/> or <http://www.vce.org/>.

216 signatures!

sign petition!

Are you at risk?

To find out if you are, read on!

If you have questions or concerns, contact Citizens Concerned About Chloramine (CCAC) at (650) 328-0424.

Chloramine = Chlorine + AMMONIA

A New Additive in the Water

On February 2, 2004, the San Francisco Public Utilities Commission (SFPUC) added a new disinfectant, **chloramine**, a combination of **chlorine** and **ammonia**, into the Hetch Hetchy water supply. As a result, users in the Bay Area began to experience a range of reactions including:

RESPIRATORY SYMPTOMS

- sinus and nasal congestion
- sneezing
- coughing
- choking
- wheezing
- life-threatening asthma-like symptoms
- bronchial and emphysema-like symptoms

SKIN SYMPTOMS

- rashes and red burning skin
- intense itching
- dry, chapping, flaking, cracking skin
- welts and blistering skin with scarring and pigmentation
- peeling, bleeding lips, dry mouth and throat
- dry eyes

DIGESTIVE DISORDER SYMPTOMS

- irritable bowel symptoms-like reactions (IBS)
- acid reflux-like symptoms

Neither the public nor the city water boards were consulted or involved in the decision to use chloramine in place of chlorine. The SFPUC says that chloramine is "safe" even though no one knows if it can cause cancer. Are we to be used as guinea pigs to

Citizens Concerned About Chloramine (CCAC)

San Francisco Bay Area, California 650 328-0424 Send an email to CCAC

Home

Mission Statement

The CCAC Flier

CCAC Overview

Chloramine Facts

Toxic Showers and Baths

Effects on Environment

Effects on Plumbing

SFPUC Fail to Report on Health Study on Chloramine

CCAC Recommendations

CCAC History

Citizens Concerned About Chloramine (CCAC)

Welcome to the website of **Citizens Concerned About Chloramine (CCAC)**, a nonprofit organization based in the San Francisco Bay Area, California.

Last modified: 07/31/2009 02:11:14

Homepage > PITTSBURGH NEWS

Team 4: Water Companies Switch Chemicals, But Is It Safe?

Companies Switching From Chlorine To Chloramine

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POSTED: 6:10 pm EDT March 20, 2009
 UPDATED: 7:19 pm EDT March 20, 2009

PITTSBURGH -- While some Pittsburgh-area water suppliers prepare to add new chemicals to the drinking water, others have already made the change.

Water companies maintain the chemicals are safe, but critics believe otherwise.

As part of a Team 4 investigation, Channel 4 Action News reporter Jim Parsons found the chemicals being added are those used to kill bacteria.

Several suppliers are switching or have switched from chlorine to chloramine, a disinfectant already used in one-third of the country's public water supplies.

In Summary, Nanofiltration Approach Compared To Monochloramine

Conventional Treatment: \$57 million	
Adding an Alternative Disinfectant: Monochloramine	Removing Organics: Nanofiltration
+ \$0.5 million	+ \$26 – 30 million

- **Nanofiltration offers:**
 - A more “permanent” long-term solution
 - More reliability and certainty
 - Greater ability to address future regulations without need for upgrades down the road
 - Less likelihood of public concerns relative to health effects

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Next Steps

- **Conduct additional nanofiltration testing (May – August)**
 - Demonstration testing to optimize design parameters to save costs
- **Notify RI Department of Health to change consent agreement technical selection**
- **Issue RFP to D/B firms (~ October)**

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