Information On Tap

In the following sections we will discuss and continue to expand various topics of interest and provide links that validate the statements made thus allowing you to read, research, and make up your own mind on specific matters. If you need or have additional questions, we are happy to address them.

Understanding Drinking Water is Complicated and Often Confusing:

The District's dedicated, licensed and experienced personnel take pride in doing their jobs well and ask that our customers reach out to our staff as a resource if you have water related questions. This will help customers understand the complexity of drinking water regulations.

We welcome the public to attend monthly Trustees meetings. District Trustees are elected towns people, who serve on the Board to represent our customers. We also offer public tours of our facilities.

> ***This section's goal is to discuss and provide our customers with as much first-hand information, knowledge, and links to supporting information from respected scientific and regulatory organizations about drinking water chemicals, contaminants and risk, including being transparent about what we know and what we do not know.***

The York Water District and all other Maine Drinking Water Suppliers are committed to providing drinking water that protects public health by minimizing potential health risks. Ensuring the health and safety of our customers which include ourselves and many times our families is priority one.

The Mission of the District is to provide our Customers with a safe, reliable supply of water that meets or exceeds all State and Federal Health Standards in an environmentally sensitive manner. We are dedicated to conserving and protecting the District's natural resources and assets to ensure high quality drinking water at the most reasonable cost.
Exceptional customer service is our number one priority.

> ***You may have recently taken note of regional activist groups that seek to spread misinformation and half-truths for the sake of instilling and taking advantage of fear. We believe that you, our customers can and should make the decisions for yourselves. We will work to provide you with scientific evidence, from respected and peer reviewed sources, that seeks to tell the entire story.***

NEW

Monochloramine, Free Chlorine, Disinfection, and Public Health:

ARTICLE DEFINITIONS:

- **Chlorine:** General term referring to any one of the three forms of chlorine used in drinking water; Free Chlorine, Monochloramine, or Chlorine Dioxide.
- **Primary Disinfection**: Term used to represent the initial killing or deactivation of human disease-causing organisms/pathogens.
- **Secondary Disinfection:** Term used to represent the chlorine residual required to be maintained in distribution piping to protect human health from issues that might occur within the piping system.
- **Distribution System:** The network of pipes, typically underground, that convey and serve water.
- **Free Chlorine:** Very common and reactive disinfectant, sometimes called bleach, used to make and keep water safe for human consumption.
- **Monochloramine:** Common secondary disinfectant, used primarily to maintain required chlorine levels in the distribution system and reduce formation of disinfection byproducts.
- **Organic Precursors/Materials:** Naturally occurring substances, typically present in untreated water that can react with disinfectants to form disinfection byproducts.
- **Disinfection Byproducts:** Substances that may form when a disinfectant reacts with naturally occurring organic matter in water.
- **Trihalomethanes (THMs):** Term relating to the four regulated chemical disinfection byproducts whose levels must be monitored and controlled to protect human health.
- **Haloacetic Acids (HAAs):** Term relating to five regulated chemical disinfection byproducts that contain chlorine and bromine whose levels must be monitored and controlled to protect health.
- **Water Age:** Term representing the time treated water typically stays in the pipes before use.
- **Granular Activated Carbon (GAC) Technology:** A filter material made from raw organic materials high in carbon (coconut shells or coal), proven to remove organic chemicals from water.
- **Ozonation Technology:** Powerful disinfection and oxidation technique based on the infusion of hazardous ozone gas into water.
- **Ultra-Violet light Technology:** Effective method for disinfecting water whereby ultraviolet light penetrates water and destroys human pathogens by attacking the genetic code (DNA).
- **US EPA (EPA):** United States Environmental Protection Agency sets drinking water regulations.
- **State of Maine Drinking Water Program:** State agency responsible for monitoring and ensuring that drinking water regulations are followed.
- **US Department of Health and Human Services (DHHS)**: Also known as the Health Department, a department of the federal government with the goal of protecting the health of Americans.
- **US Center for Disease Control and Prevention (CDC):** Department under the DHHS who's goal is to protect public health and safety through the control and prevention of disease.
- **World Health Organization (WHO):** A specialized agency of the United Nations concerned with international public health providing leadership on critical health matters, shaping research agenda, setting norms and standards, presenting evidence-based policy options, and technical support.
- **International Agency for Research on Cancer (IARC):** An intergovernmental agency of the WHO whose role is to conduct and coordinate research into the causes of cancer.
- **PPM:** Parts per million concentration also expressed as milligrams/liter. Scale: 1 inch in 16 miles.
- **PPB:** Parts per billion also expressed as micrograms/Liter. Scale: 1 drop in a large tanker truck.
- **MCL & MCLG:** Maximum Contamination Level & Maximum Contamination Level Goal. MCL is the legal and enforceable threshold level allowed in public water and MCLG is an aspirational goal including a margin of safety where no anticipated adverse health effects are expected to occur.

Article Summary:

York Water District is committed to providing drinking water that maximizes public health and minimizes potential health risks. We do recognize that its normal for people to wish for their drinking water to be completely free of contaminants and chemicals, but removing all chemicals and contaminants is sometimes not technological or financially feasible or even necessary to protect health.

Maintaining a level of disinfection in the water distribution system is required to keep water safe. Under the Safe Drinking Water Act, the EPA allows drinking water treatment processes to use free chlorine and monochloramine to disinfect drinking water. Research shows that chloramine and free chlorine both have great benefit but some drawbacks, however, both disinfection types are proven US EPA listed best available technology for safe use in drinking water.

The District is confident that monochloramine use will be around for a long time as we have found nor heard of any new scientific evidence from respected sources that contradicts or creates any reasonable suspicion of doubt about the validity of studies done that say monochloramine is safe. However, we fully support that EPA continues to encourage research on the safety of monochloramines as a drinking water disinfectant along with the many other contaminants. We will continue to monitor the recommendations of U.S. Environmental Protection Agency and Centers for Disease Control and Prevention as well as relevant research to make sure our operations are based on the best available information.

Background:

It is widely known and accepted by most drinking water experts that disinfection of drinking water with chlorine is essential to protecting public health from waterborne diseases. Although alternative disinfection methods like Ozone and Ultraviolet Light are starting to gain ground mainly for large systems that can afford them. Free chlorine, similar to a household bleach but made for human consumption, is by far most often used to kill disease causing organisms in raw water. This first kill or stage is typically called "primary disinfection." The major draw-back from making water safe in this manner is that free chlorine can inadvertently combine with organic materials present in the raw water to form some unintended chemicals that are suspected human carcinogens. Some of these identified "byproducts" of disinfection must be monitored, controlled, and minimized so as not to create new potential "risk" of health problems. York Water District is fortunate to own or control most of it's watershed decreasing risk from inadvertent chemical releases to our environment.

> ***Most people are now too young to remember that drinking water disinfected with chlorine has made many once-common waterborne diseases that regularly killed 1000s of people annually, like typhoid and cholera, a thing of the past.***

In addition to initial disinfection of raw water for human consumption, the EPA requires a level of a type of chlorine and only chlorine (no other chemical or methods are allowed) disinfectant be maintained in the many miles of water pipes to protect water from being contaminated as its being distributed to customers. This is typically called "secondary disinfection."

> ***The two practical and most common forms of chlorine available to use in the distribution piping are free chlorine and monochloramine disinfectants.***

Free chlorine and monochloramine are the two major secondary disinfectants used to disinfect public water today. Both of these common disinfectants have a number of strengths and weaknesses when used in maintaining a form of chlorine in distribution piping. These pros and cons are weighed by the District's drinking water professionals, experts and consultants to determine what the best choice is for the water system. As you might expect, drinking water systems, select treatment based on an assortment of factors and regulatory requirements related to; the quality of the raw water to be treated (groundwater, surface water and sometimes a mix), existing treatment and technologies, site/location features, technical difficulty, cost, anticipated future drinking water rules and requirements, characteristics of the distribution piping system, and the ability to meet other objectives. The State Drinking Water Program must then approve these decisions before moving forward.

Unintended Byproducts of the Disinfection Process:

One of the drawbacks from use of the three forms of Chlorine (Free Chlorine, Monochloramine, Chlorine Dioxide-very rarely used) used to disinfect water and make it safe for consumption is that various amounts and types of unintended chemicals known as "byproducts" can be created. The types and amounts of byproducts typically vary significantly based on; (1) the type of chlorine used, (2) the specific raw water quality treated, as well as (3) how long the treated water is in distribution piping (water age).

> ***All forms of chlorine develop some byproducts so each individual water utility must weigh the pros, cons and objectives when deciding which form to use. The EPA has established, and history has shown, that the benefits of eliminating waterborne disease through disinfection with chlorine far outweighs the drawback of human exposure to disinfection byproducts.***

Types of Byproducts and Byproduct Monitoring:

We can group byproducts into three types; those regulated by the EPA, those unregulated, and those unknown. The US EPA has determined that some specific disinfection byproducts (DBPs), as supported by extensive drinking water research, such as Haloacetic Acids (HAAs) and Trihalomethanes (THMs) have the potential to be harmful to humans and therefore must be regulated. The EPA has set maximum levels for these regulated byproducts in drinking water. These levels must be monitored and controlled by our staff (through regular sampling and distribution system flushing) so as not to create significant new health risks. There are additional known byproducts that have remained unregulated as they have not been found to present significant health concerns and there are likely some that have not been detected or identified yet. All water utilities are required to notify their customers if regulated DBP levels are exceeded.

Every five years the EPA publishes a list of unregulated contaminants called the Contaminant Candidate List (CCL). These are contaminants that are anticipated to occur in public water systems so they could justify regulation. The EPA then requires water utilities to sample for a final list of contaminants using approved laboratories. The scientifically valid results and information collected are submitted to the EPA so they can evaluate the occurrence of the contaminants in drinking water thus permitting the assessment of the population exposed and the levels of exposure to the contaminants. From this data the EPA develops regulatory decisions and determines whether-or-not to regulate new contaminants in the interest of protecting public health. The District must follow the US EPA drinking water standards and regulations while the State of Maine Drinking Water Program monitors and enforces them.

Drinking Water Regulations are and should be based on an overall consistent understanding and preponderance of scientific evidence from the respected community of scientists rather than the agenda of a special interest group.

The process of establishing regulated levels of contaminants in drinking water is complex, time consuming, and sometimes painstakingly slow. It takes time for scientists to collect and compare all available information and to perform a health risk assessment to determine and set a level that could be associated with health effects. The process is meant to provide the appropriate checks and balances needed. The EPA's goal is clear; to protect public health.

Use of Chloramine Disinfectant is Safe and Even Growing in Use:

Chlorine was first used as a drinking water disinfectant in Europe in the late 1800's. It was reported that free chlorine was first used in the U.S. in 1908 in Jersey City, New Jersey, more than one hundred years ago. Monochloramine was used as a drinking water disinfectant in Springfield, Illinois and Lansing Michigan in 1929, more than 90 years ago and is still used today. While the use of monochloramine did shortly slow and even fall backwards in World War II due to ammonia shortages but in recent decades, monochloramine use has been increasing, primarily due to its ability to significantly reduce the regulated disinfection byproducts (DBPs) HAAs and THMs.

Monochloramine is simply free chlorine (Cl) combined with a small amount of free ammonia (NH_3) under specific and controlled conditions to maximize formation of Monochloramine (NH_2Cl) disinfectant.

The dose of ammonia needed to form Monochloramine is four times less than the dose of free chlorine used in treatment. This typical ammonia level added is very low, less than 0.5 PPM which is equivalent to approximately 5 teaspoons in in a 20,000-gallon swimming pool. Low levels of ammonia are common in food, reservoir waters, some ground waters, and drinking waters.

Ammonia is unregulated at the concentration found in drinking water so there is NO evidence that ammonia in drinking water can cause cancer.

Ammonia at the level in drinking water has NOT been classified for any carcinogenic effects by the US EPA, US Department of Health and Human Services (DHHS), US Center for Disease Control and Prevention (CDC), World Health Organization (WHO), or the International Agency for Research on Cancer (IARC).

As homeowners we understand that it is unsafe to combine household chemical cleaners such as chlorine bleach and ammonia. These solutions are inherently dangerous and hazardous because they are highly concentrated solutions, more than 10,000 times higher than the concentrations seen in drinking water. All chemicals must be handled with great care.

For Monochloramine, Like Free Chlorine, there is an Achievable Health-Based Goal:

The US Environmental Protection Agency (US EPA) and the World Health Organization (WHO) have research and experience that indicates Monochloramine levels up to 4 and 3 mg/L, respectively, are considered safe and beneficial in drinking water. These monochloramine standards are set at a level where no human health effects are expected to occur.

These are "Health-based" goals that provide the highest level of protection possible as they have an additional uncertainty or "safety" factor built into the number (level) to ensure they are amply protective of human health.

Since the normal York Water District target dose of monochloramine is 2.0 mg/L with a typical maximum of 2.5; this means that <u>NO</u> harmful effects to human health are expected to occur from its use!

<u>This Monochloramine Evaluation Data is Proven and Has Stood the Test of Time:</u>
Chloramines use has been used widely for over 90 years in the U.S., Canada, and Great Britain and its use has been on the rise in recent years because it reduces known disinfection byproducts associated with use of free chlorine. More than one in five Americans consume drinking water treated with monochloramine. It has been used safely for decades in major cities such as Denver Colorado (1918), Portland Oregon (1924), Boston MWRA (1932), Portland Maine (1938), Dallas (1959), San Diego (1982), Tampa Bay, Miami (1982), Philadelphia (1969), Minneapolis (1954), Champlain Vermont (2006) and York Water District (1982) among many others. Most recently, in 2006, San Francisco, California converted to Monochloramines after addressing unscientific and unproven claims from activist groups that monochloramine was not safe.

In southern Maine, Portland Water District, Maine Water (Biddeford & Saco), Kennebunk, Kennebunkport, and Wells Water District, and York Water District use monochloramine to serve nearly 15% of the population of Maine. Monochloramine has been used in Southern Maine including York for over 38 years with no significant water quality issues.

The data used to determine the safety of Monochloramines is getting older but since we closely monitor changes on a routine basis, we are confident when we say that there has been no significant scientific evidence, from respected and trusted sources, that sheds doubt on the conclusions made in the 90's.

However, we take the job very seriously to continue to monitor recommendations of the US EPA and CDC as well as relevant research to make sure our operation continues to be based on the best available information.

We can only work from what we know is true today. What we know today, might be half of what we know tomorrow. Recommendations and regulations are updated periodically as more credible information becomes available. The EPA continues to encourage research on the safety of monochloramines as a drinking water disinfectant along with the many other contaminants and we fully support this as common sense.

<u>Selection of Monochloramine for Secondary Disinfection at York Water District</u>:
Types and amounts of disinfection byproducts typically vary significantly based on; (1) the type of chlorine used, (2) the specific raw water quality treated, (3) as well as how long the treated water is in the distribution piping (water age).

The regulated disinfection byproducts HAAs and THMs will continue to form as water ages and is delivered to customers. Use of monochloramine greatly slows their formation when compared to free chlorine use.

In the early 1980s, York Water District voluntarily instituted monitoring for the DBPs THMs as suggested by the State of Maine Drinking Water Program. The results of this monitoring found results higher than the proposed regulatory level.

> ***In response, the District and it's consultants decided to institute monochloramination in 1982, more than 35 years ago. Formation of the DBPs known as THMs were reduced by over 67% with implementation and use of monochloramine! The DBP HAAs are also reduced but were not monitored and regulated until a short time later.***

At the time of implementation, monochloramine technology was known to have many benefits besides forming fewer DBPs when compared to free chlorine. It is efficient, cost effective, and easy to install and operate. The use of monochloramine is often more affordable and requires less new equipment than other alternatives for reducing DBPs, especially since the District was already using chlorine. There are many benefits to our customers as well. Disinfection with monochloramine is stronger and lasts longer in the distribution system thereby providing better protection against bacterial regrowth in the distribution system. Monochloramine residuals maintain better water quality over a longer period of time in the distribution system than free chlorine. Water treated with monochloramine has less of a chlorine taste and very little smell that is associated with free chlorine. Water utilities switching from free chlorine to monochloramine report fewer consumer complaints regarding the taste and odor of the water. York Water District maintains nearly 100 miles of pipe today (= increased water age) we are still far below the EPA maximum contaminant level both THMs and HAAs.

Why Doesn't Everyone Use Monochloramines?

> ***There is no magic bullet to reducing Disinfection Byproducts (DBPs).***

There is a higher likelihood to finding regulated DBPs in drinking water from water utilities with surface water supplies (ponds and reservoirs) particularly when they also have a large piping system. Systems with these characteristics are more likely to naturally have more DBP precursors and "higher water age" which could allow higher DBPs to form with use of free chlorine.

> ***Monochloramine use is common for these systems particularly where they already have invested in existing treatment infrastructure, such as a treatment plant, where the technology is easily paired without extensive modification and capital costs that would drive up water rates further.***

Groundwater drinking water supplies are less likely to contain organic precursors that will form DBPs than surface waters, so most often these systems can just use free chlorine and not need the added step and cost of adding ammonia to form monochloramine as DBP formation is naturally low. Groundwater systems typically have the characteristics that allow use of just free chlorine. Groundwaters have their own set of typical contaminants of concern leading to their own challenges.

As of April 2019, there were 155 municipal water systems in Maine. 98 of these were ground water supplies who we would expect to use free chlorine. Of the remaining 57 surface water systems; 19 use monochloramine serving a population of over 343,000 and the remaining 38 systems, serving a smaller population of 262,656 use free chlorine as a secondary disinfectant.

There are also alternative technologies to monochloramines for reducing DBPs (not eliminating them) that could be considered including Granular Activated Carbon (GAC), Ozonation, and Ultra-Violet light.

> ***These technologies are not solutions to Disinfection Byproducts. DBPs still form to varying degrees when chlorine is added as required in the distribution system. A range of factors must be considered, and an evaluation is needed on a case by case basis.***

These alternative technologies are generally more affordable and practical for larger water systems where the rate base is large and where the volume produced is high. In addition, the investment is typically much higher for adding them to existing technology, so these are also more likely to be affordable and seriously considered when current infrastructure needs a major upgrade.

We believe GAC to be a great technology but know it's not the answer in itself. Activists against monochloramines in favor of GAC technology site Grande Isle Consolidated Water District of Grande Isle, Vermont for NOT choosing monochloramination and implementing GAC in 2015 to reduce their regulated DBPs (HAAs and THMs).

> ***After the upgrade to GAC technology, in 2018 Grande Isle reported their DBP highs for HAAs to be 34 ppb and THMs to be 41 ppb. For 2018, York Water District's highest HAAs and THMs were 10-15% lower than Grande Isle! YWD's highest HAAs were 29 ppb and THMs at 37 ppb.***

YWD provides reliable supply of water that meets or exceeds all State and Federal Health Standard at the most reasonable cost with our current treatment process. We will however continue to look closely and continuously with our consultants at technology and data to determine whether a newer technology warrants a change.

Swimming Pools and "OTHER" Species of Chloramine:
There is sometimes confusion over the difference between the three forms of Chloramine, two of which are not used in drinking water. In drinking water, the process is highly controlled to target formation of "monochloramine" type disinfectant. In addition, drinking water treatment is also optimized to produce stable water quality in order to prevent deterioration to any of the other types.

> ***Monochloramine used to treat drinking water is NOT the same type of chloramine that can form and create poor indoor air quality around swimming pools.***

The two other undesirable species of chloramines known as Dichloramine and Trichloramine can and do form where pools are poorly managed. These forms are sometimes mistaken as the form utilized in drinking water, but they are NOT. These two forms are easy detected at very low levels. A pools uncontrolled chemistry is constantly undergoing changes typically due to poor ventilation, chlorine degradation and additions (Sun/UV light degrades free chlorine), pH changes, and the number of people and amount of sweat and urine (uncontrolled addition of ammonia sources) in pools, can create the conditions that will allow these undesirable types to form. As you will note with some pools, those managed well and continuously, this issue does not typically exist.

Monochloramine and Lead in Drinking Water:
Monochloramine itself does not add lead to drinking water nor does its use mean that there will be lead in drinking water. Problems with lead levels in Washington DC's water after transition from free chlorine to monochloramine several years ago could have been avoided with proper treatment and monitoring. The problem was resolved with the addition of a phosphate which is a common treatment technique but was not in use in DC at the time.

> ***Significantly altered water chemistry can impact the stability of piping corrosion control coatings leading to the breakdown and release of lead and copper into the water. All interconnected systems in southern Maine currently add a phosphate corrosion inhibitor and have moved or are moving to standardized water quality to prevent potential issues from changes in chemistry.***

There have been improvements made after the lessons learned from the DC lead crisis. There are strict operation safeguards and precautions in place whereby any proposed water system water quality changes must first be reviewed and approved by the State Drinking Water Program and if changes are approved, increased monitoring and demonstration of lead and copper corrosion control optimization is required to ensure the protection of customers. The EPA has also developed a guidance manual that provides recommendations to systems switching disinfectants in order to minimize increases in the rate of lead and copper corrosion. If a water system were to find results over the regulated levels, immediate public notification is required.

Other Important Applications and Benefits to Use of Monochloramine Technology:
When a water system is part of a larger network of interconnected water systems sometimes known as consecutive systems, there is inherently increased water age as water must travel further in pipes. We have established that a surface water supplier that uses free chlorine in a large distribution network of piping would likely have elevated DBPs due to high water age and need to add higher free chlorine to keep water safe in the outreaches of the system. Therefore, the potential to be above DBP regulated levels exists. For this reason, it is common for those water utilities with extensive distribution systems to use monochloramines to keep DBP levels lower.

> ***It is also common and important for connected water systems to standardize water quality as much as possible to make waters as seamless as possible and prevent significant changes in chemistry. Good collaboration and inter-system communication between interconnected systems is therefore essential.***

Monochloramine not only forms fewer disinfection byproducts compared to chlorine, the use of monochloramine technology is efficient, easy to install and operate and is often more affordable and requires less new equipment than other alternatives for reducing DBPs, particularly if a water utility is already using chlorine. Other characteristics important to large systems include; water with monochloramine is stronger and lasts longer in the distribution system thereby providing better protection against bacterial regrowth. Systems that use monochloramine can maintain better water quality over a longer period of time than free chlorine. Water treated with monochloramine has less of a chlorine taste and smell than water with free chlorine as water utilities switching from chlorine to monochloramine report fewer consumer concerns about the taste and odor of the water.

Important other benefits to these consecutive systems include: less disruptions to water service, improved water quality, increased available fire-fighting flows, and improved service response to major main breaks and other distribution events.

<u>Main Breaks and Releases to the Environment:</u>
With sometimes hundreds of miles of pipe in the ground distributing water to customers, it's not difficult to believe that the occasional break in a pipe may occur spilling drinking water into our environment.

> ***Water District personnel can many times have a broken section of pipe (leaks) shut down and isolated from the system in less than half an hour limiting the amount chlorine entering our environment. We have found no evidence that declares one form of chlorine (free chlorine or monochloramine) is worse or better for the environment than the other.***

Water District personnel are also trained and have the tools to de-chlorinate or de-chloraminate water (remove), when possible, so that it can move into the environment safely. Simple methods exist that can quickly remove all chlorine forms before entering the environment thus limiting the destructiveness of chlorinated and monochloraminated water. There are liquid and solid puck style dechlorinating substances readily available that will quickly destroy all forms of chlorine as it travels on the ground before entering waterways. In addition, as drinking water travels over ground and grass and plants, the amount of chlorine will typically continue to dissipate.

> ***Although we seek to minimize it, there will undoubtedly be times that some drinking water enters the environment without removal of chlorine. We are always hard at work attempting to limit this amount, but it is a trade-off for the convenience of delivery of water directly to your home.***

<u>Free Chlorine, Monochloramine and Dialysis</u>:
Like free chlorine, monochloramine can be harmful if it is not removed from water in dialysis so it's important to get the message out.

> ***The District has contacted a local Dialysis company and they say that they do not need to make any changes in dialysis procedure regardless of the form of chlorine and in fact there is at least one water system in Maine that changes regularly from free chlorine to monochloramine and they have never had a problem with this change. They also do not expect any increase in cost due to this change.***

Like everyone else, dialysis patients can drink monochloraminated water because the digestive process neutralizes monochloramine. We suggest people contact their Dialysis companies to further discuss this.

<u>Sensitivity to Free Chlorine and Monochloramine</u>:
It is possible that a small population is sensitive to monochloramines like they are with free chlorine, but it is not anticipated to be a significant difference. In some systems that use monochloramine, a small percentage of customers complained of a health problem.

Recently transitioned water utilities (to monochloramine) in San Francisco and Vermont reported to have less than 100 people who reported adverse reaction of the almost 2.5 million people served. In San Francisco it was reported that the symptoms could have resulted from underlying and pre-existing conditions, so no further study was performed. The Vermont/CDC investigation reported a strong bias introduced by anti-monochloramine literature and participation of anti-monochloramine group members in the survey and recommended future studies should be designed to eliminate this bias (CDC, 2008).

People who believe that their skin problems are related to monochloramine should consult with their doctors. Skin problems are a common problem where it's often difficult to trace the causes. We are happy to report that it has been extremely rare (we know of only one) that the York Water District has received complaints of potential sensitivity over 38 years of use in York, Maine!

<u>What if You Wish to Further Reduce Your Exposure?:</u>

The removal of monochloramine is not necessary from a public health perspective, however, you can choose to remove monochloramine for your own purposes or piece of mind. Whole house and point of use devices (faucet) can be used to eliminate or reduce the monochloramine in household water. These devices are filtration systems with granular activated carbon or charcoal. The National Sanitation Foundation (NSF) independently tests and certifies water treatment systems for chloramine removal. Information on NSF certified drinking water treatment units can be found on-line.

LINKS TO IMPORTANT SUPPORTING INFORMATION:

- **Disinfection with Chlorine & Chloramine:**
  https://www.cdc.gov/healthywater/drinking/public/water_disinfection.html
- **National Primary Drinking Water Regulations (USEPA)**:
  https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations
- **Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (USEPA)**:
  https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals
- **How EPA Regulates Drinking Water Contaminants**:
  https://www.epa.gov/dwregdev/how-epa-regulates-drinking-water-contaminants
- **Determination of MCLGs and MCLs:**
  https://nepis.epa.gov/Exe/ZyNET.exe/P100NBDX.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1986+Thru+1990&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C86thru90%5CTxt%5C00000032%5CP100NBDX.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL#
- **San Francisco Water, Power, & Sewer**:
  https://www.sfwater.org/index.aspx?page=357
- **San Francisco Water, Power, & Sewer: Questions and Answers Regarding Chloramine**
  https://www.sfwater.org/index.aspx?page=430
- **San Francisco Water, Power, & Sewer: Tufts Medical Opinion**
  https://www.sfwater.org/modules/showdocument.aspx?documentid=4106
- **San Francisco Water, Power, & Sewer: Health Officer Consensus Statement**
  https://www.sfwater.org/modules/showdocument.aspx?documentid=963
- **Grand Isle Consolidated Water District:**
  https://www.grandislevt.org/departments/consolidated-water-district/
- **International Agency for Research on Cancer (IARC):**
  https://www.iarc.fr/
- **Consecutive Water System Guidance Document for Navy Installations (UG-2034-ENV):**
  http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.848.9846&rep=rep1&type=pdf
- **Vermont Department of Health: Public Health Review of Monochloramine**
  https://www.healthvermont.gov/sites/default/files/documents/2016/12/Env_DW_public_health_review_of_monochloramine.pdf