

CHLORAMINES

Frequently asked questions, health effects, and effects on fish hobbyists and aquaculture businesses.

During the month of November 2005, the Burlington Municipal Water Works (BMWW), supplier of water to the City of Burlington, the City of West Burlington, the City of Middletown, the City of Danville, the Iowa Army Ammunition Plant and Rathbun Regional Water Association public water customers, will change its disinfection process for drinking water from chlorination to chloramination. BMWW is making this change to comply with the Federal Safe Drinking Water Act. Chloramination will reduce levels of certain by-products of chlorination [total trihalomethanes (TTHMs) and Haloacetic Acids (HAA5s)] that are suspected carcinogens.

The Burlington Municipal Waterworks is changing to chloramines to meet new standards set by the EPA regarding byproducts of the disinfection process, including Total Trihalomethanes (TTHM). TTHMs are formed when chlorine reacts with natural occurring organic matter in drinking water. Prolonged consumption of water with elevated levels of TTHMs is a suspected carcinogen. TTHMs do not form readily in chloraminated water. Therefore, the Burlington Municipal Waterworks in taking this step to ensure it is providing the safest, highest quality drinking water possible to its customers.

Chloramines have been used successfully as a disinfectant in drinking water throughout the United States for many decades, including the local cities of Davenport, Cedar Rapids, Ottumwa and Keokuk. For most normal uses of drinking water, chloraminated water is the same as chlorinated water.

Chloraminated water is safe for bathing, drinking, cooking and all everyday uses. For the majority of customers there will be no negative impacts. However there are two groups of people who need to take special care with chloraminated water: kidney dialysis patients and persons who keep fish, aquatic or semi-aquatic life.

FREQUENTLY ASKED QUESTIONS

Q: What is the disinfection process?

A: Disinfection is a step in the water treatment process to assure the biological safety of water. Chlorine, chloramines and other chemicals can be used as disinfectants.

Q: What is the current drinking water disinfection method?

A: The current method of disinfection used by BMWW is chlorination. In this process, chlorine is added to drinking water at a controlled level. Chlorination is an effective way to kill many kinds of bacteria and other germs that may be harmful to one's health.

Q: In addition to providing disinfection, does chlorine participate in any other chemical reaction?

A: During the disinfection process at the treatment plants and while the water is in the distribution system waiting to be used, chlorine can combine with natural organic matter in the water to form a family of chemical compounds known as Disinfection Byproducts (DBP's), which include trihalomethanes (THMs). There is some concern that THMs may be potential carcinogens.

Q: Why is a change necessary?

A: The new regulation called the Stage 1 Disinfection Byproduct Rule requires water producers to limit the running average to THMs to 80 parts per billion in the distribution system. Currently the entities outside the City of Burlington who purchase water from the BMWW are in violation of this rule. Chloramination will reduce levels of certain by-products of chlorination. These disinfection byproducts, called trihalomethanes (TTHMs) and haloacetic acids (HAA5s), result from reactions of chlorine with the small amounts of naturally occurring organic substances in filtered drinking water. Both TTHMs and HAA5s are suspected carcinogens.

Q: What is chloramination?

A: Chloramination is the use of both ammonia and chlorine to disinfect water. Ammonia and chlorine are added to water at carefully controlled levels. The chlorine and ammonia react chemically to produce combined chlorine or chloramines. Chloramine is formed when ammonia is added to water that contains free chlorine. Depending upon the pH and the amount of ammonia, ammonia reacts to form one of three chloramine compounds. NH_2Cl , monochloramine, is the preferred compound and is the one BMWW will use.

Q: What are some of the advantages associated with the chloramine disinfectant?

A: The addition of chloramine to the disinfection process will quench the production of the chlorine byproducts (i.e. the THMs). The water leaving the treatment plants and entering the distribution systems will have had the bacteria killed or inactivated, but the reaction that produces THMs will have been arrested and the level of those chemicals in the water delivered to the customers will be substantially reduced. Additionally, there will be less of a chlorine taste and odor in the water.

Q: Is chloramine safe and are there any negative effects to the changeover?

A: Yes. Chloramine is safe. EPA accepts chloramine as a disinfectant and recognizes its ability to control THM formation. Chloraminated water is safe for bathing, drinking, cooking and all everyday uses. For the majority of the consumers there will be no negative effects as a result of the change. However, there are two groups of people who need to take special care with

chloraminated water: kidney dialysis patients and persons who keep fish, aquatic or semi-aquatic life.

Q: Are chloramines new?

A: No. Many counties and cities in the U.S. have used chloramines for decades. Chloramine has been approved by the EPA for use as a municipal drinking water disinfectant for decades. It is a water quality improvement as it reduces DBP levels.

Q: Will chloramination affect routine household water uses?

A: No. Chloramination will not affect routine water uses such as food preparation, household laundering and dishwashing, watering plants, etc. Chloramines will not have any effect on plants of any type, and will usually be removed by the high chlorine demand in the soil.

Q: Does bottled water have chloramines?

A: Bottled water may contain chloramines if the bottled water company uses water supplied by a chloraminated water system, unless the company takes special steps to remove them.

Q: Will chloramines affect routine business or industry water uses?

A: Businesses and industries that use water in any manufacturing process, for food or beverage preparation, commercial laundering operations, laboratory procedures, seafood handling or other processes in which water characteristics must be carefully controlled need to be aware of the change in water disinfectant from chlorine to chloramines, and must remove chloramine from the water prior to use as they did with chlorine. The switch to chloramine may require companies to adjust or upgrade their current treatment system. Businesses should contact their water treatment equipment supplier, equipment manufacturers or other suppliers to determine if chloramine could impact their system and what changes may be needed.

Q: What methods are available to remove chloramine?

A: Carbon filtration or water treatment products that neutralize chloramine may be used. If you use a carbon filter it must contain high quality granular activated carbon and you must permit sufficient contact time.

Q: Will reverse osmosis remove chloramine?

A: No. Salts can be caught by the permeable membranes, but chloramine may pass through the membranes.

Q: Do home water softeners remove chloramines?

A: Most water softeners are not designed to remove chloramines.

Q: Will the change to chloramines affect my plumbing?

A: The change to chloramines may cause some rubber or synthetic rubber materials in household plumbing fixtures to degrade faster. Though rare, signs of degradation can include small black flakes in water and plumbing fixtures. This problem has not been widespread in areas that have already converted to chloramine. As rubber plumbing parts wear out, consumers should replace rubber plumbing components with chloramine resistant materials such as: high quality rubber (synthetic polymer) parts, flexible copper tubing, tubing made of corrugated stainless flex, or newer neoprene braided stainless steel. These supplies are readily available. Plumbing and hardware stores will be able to provide further information.

Q: Will using chloramines affect swimming pools?

A: No. Swimming pool managers and owners will still need a free chlorine residual to retard algae and bacterial growths. Contact your local pool supply store for specifics.

HEALTH EFFECTS

Q: What precautions should kidney dialysis patients take?

A: As with chlorine, chloramines must also be removed from the water used in kidney dialysis machines. BMWW has notified Great River Medical Center and the Southeastern Renal Dialysis Center of its upcoming change to chloramines. If you are a dialysis patient and have any questions, please call your physician or the dialysis center where you are treated.

Q: Why will kidney dialysis patients be affected by chloramines?

A: Chloramines are harmful when they go directly into the bloodstream. In the dialysis process, water comes into contact with blood across a permeable membrane. Chloramines in dialysis water would be toxic, just as chlorine in dialysis would be toxic, and therefore must be removed from water used in kidney dialysis machines.

Q: What should people with home dialysis machines do to remove chloramines?

A: You should first check with your physician who will probably recommend the appropriate type of water treatment. Often, home dialysis service companies can make the needed modifications, but you should check with your physician to be certain.

Q: Can kidney dialysis patients drink and bathe in chloraminated water?

A: Yes.

Q: If chloramines shouldn't mix with blood, is it safe to drink water containing them?

A: Yes. Everyone can drink water that is chloraminated because the digestive process neutralizes the chloramines before they reach the bloodstream. Even kidney dialysis patients can drink, cook and bathe in chloraminated water. It's only when water interacts directly with the bloodstream, as in dialysis or in a fish's gill structure, the chloramines must be removed.

Q: Is chloraminated tap water safe for the general public and people with suppressed autoimmune system (AIDS, cancer, kidney dialysis, diabetes, hepatitis, lupus)?

A: Chloraminated water is safe for the general public and for people with suppressed immune systems or other diseases. Because neither chloramine nor chlorine destroy certain protozoans like cryptosporidium, some people who have compromised immune systems may wish to use bottled water or to boil their water to make sure that they are not exposed to pathogens that might be present in the water despite the use of these disinfectants.

Q: Can children and pregnant women drink chloraminated water?

A: Yes, everyone can drink water containing chloramine.

Q: Can I use chloraminated water to prepare my baby's formula?

A: Yes

Q: Can people on low-sodium diets, or with diabetes use chloraminated water?

A: Yes. People with those medical problems can use chloraminated water for all purposes.

Q: Can I wash an open wound, such as a cut, with chloraminated water?

A: Yes. Chloraminated water will not enter the bloodstream.

FISH HOBBYISTS AND AQUACULTURE BUSINESSES

Fish also take chloramines directly into their bloodstreams, so chloramines must be removed from tanks, aquariums and ponds.

Q: Will chloramines change the pH of the water?

A: No. The pH of the water will remain the same.

Q: What precautions should fish hobbyists and aquaculture businesses take?

A: Chloramines should be removed from water that is used in fish tanks, ponds, and aquariums. Households, tropical fish shops and other businesses that keep fish or other animals in tanks, aquariums or ponds are encouraged to contact knowledgeable suppliers or veterinarians.

Similarly, customers who use drinking water for aquaculture (growing plants in a water tank or pond) are encouraged to get expert advice regarding chloramines. Also, restaurants and grocery stores with lobster tanks must take special precautions to treat the water.

Q: Are Koi fish affected by chloramine like other fish?

A: Yes. Koi are just as susceptible to being harmed by chloramine as any other fish.

Q: Does letting water sit for a few days remove chloramine from tanks for pond water?

A: No. Unlike chlorine, which breaks up when water sits for a few days, chloramine may take weeks to disappear. If you choose not to use de-chloraminating chemical, install a granular activated carbon filter and allow sufficient contact time between the water and filter.

Q: Are both salt and fresh water fish affected by chloramines?

A: Chloramines will need to be removed if the water used to make salt-water solution comes from a chloraminated supply. Chloramines affect salt-water fish just as they affect fresh water fish.

Q: If only a small amount of water is added to the aquarium or pond to make up for evaporation, do chloramines still need to be removed?

A: This will depend on the amount of water added in relation to the size of the aquarium or pond, the time period in which it is added and the sensitivity of the animals being kept. An alternative is to monitor for total chlorine residual in the aquarium or pond while adding the chloraminated water. Total chlorine test kits are available from pet stores, pool supply stores and chemical supply houses.

Q: Can chloramines be removed by boiling water?

A: No. Boiling water is not an effective method of removing chloramines from water. The only practical methods for removing chloramines from water are using a water conditioner, which contains a dechloramination chemical, or by using granular activated carbon.

Q: Will chloramines harm my other pets?

A: No. Chloramines are only harmful to fish and other aquatic or semi-aquatic life.

Q: What can aquarium or pond owners do to remove chloramine?

A: Households, restaurants, and commercial fish tank owners will need to change their current chlorine removal process to remove chloramine. The appropriate dechlorinating products or carbon filtration equipment for removing chlorine and ammonia will be available in most pet and aquarium stores prior to the conversion.

Home remedies such as boiling water, using salts, and having water remain still are not effective methods to remove chloramine. Unlike chlorine, which only takes a few days to dissipate when remaining still, chloramine stays in the water for a few weeks. The best way for fish owners to remove chloramine is to use a conditioner that contains a dechlorinating chemical.

FOR MORE INFORMATION

Please contact Bob LeKander or Ken Gregory at the Burlington Municipal Waterworks Treatment Plant at (319) 752-7611, Monday – Friday, 8:00 AM – 5:00 PM