Chloramine Information

In June 2010, the City of Tulsa and the Tulsa Metropolitan Utility Authority announced plans to begin using chloramine as a secondary water disinfectant. In June, 2012. The City will continue to use chlorine as the system's primary disinfectant.

Why is Tulsa making this change? Switching to secondary chloramine disinfection will help Tulsa meet the EPA's stricter water safety rule which goes into effect in 2012 and provides higher standards for drinking water. By making this change, the City of Tulsa will be able to provide longer-lasting protection and water that continues to meet drinking water standards to every part of the city.

Here are a few quick facts about chloramine:

Chloramine Quick Facts

- Chloramine, like chlorine, is a disinfectant commonly used to treat drinking water.
- Chloramine is formed by adding trace amounts of ammonia to chlorine in water.
- Chloramine has been used as a disinfectant to treat water in cities across the United States since 1917 -- more than 90 years. (Now we know one reason why cancer has spread across the county, most everyone knows someone who has cancer)
- The EPA has determined that chloramine is more stable than chlorine (are they trying to kill us, or what). Chloramine has been used controlling bacterial growth in city water systems.

Health risks

Adding chloramine to the water supply can increase exposure to lead in drinking water, especially in areas with older housing; this exposure can result in increased lead levels in the bloodstream and can pose a significant health risk.

There is also evidence that exposure to chloramine can contribute to respiratory problems, including asthma, among swimmers respiratory problems related to chloramine exposure are common and prevalent among competitive swimmers.

Chloramine use, together with chlorine dioxide, ozone, and ultraviolet, have been described as public health concerns and an example of the outcome of poorly implemented environmental regulation. These methods of disinfection decrease the formation of regulated byproducts such as alkyl chloroforms, which has led to their widespread adoption. However, they can increase the formation of a number of less regulated cytotoxic and genotoxic byproducts, some of which pose greater health risks than the regulated chemicals, causing such diseases as cancer, kidney disease, thyroid damage, and birth defects.

A growing number of municipalities in the US now add ammonia to the water supply to change chlorine to chloramine. One reason is studies reporting chlorine is carcinogenic. The EPA told water suppliers to reduce the amount of trihalomethanes (chlorination byproducts) in the water supply, but did not mandate chloramines. Chloramines reduce, but do not eliminate trihalomethanes, and they generate other byproducts.

Another reason is that chloramine lasts longer. However, by definition chloramine is harder to remove than chlorine, requiring more filter material. Research published in 2007 by Dr. Michael Plewa indicated that the disinfection byproducts (DBPs) created from the use of chloramine are much more toxic than the DBPs of chlorine. These new nitrogen-containing DBPs are not regulated by the EPA. Yet, this chemical is now in the water in many US municipalities.

There are widespread reports of health problems from chloramines. It is suggested that anyone with chemical sensitivities will react badly to chloramines. The EPA reports there have been no studies done to determine the risks to epidermis, respiratory, digestive or epidemiologic systems of chloramine in water supplies, and that there are inadequate cancer studies on animals or humans. There also appear to be no allergy tests. But those individuals with extreme rashes, breathing and liver problems know the answer already.

Health problems directly experienced by many from chloramines:
• Severe skin rashes
• Dry and scaling skin
• Erupting, oozing skin
• Skin described as having chemical burns
• Skin outbreak 'like hives'
• Swollen ears
• Extreme fatigue
• Hacking coughs
• Sneezing
• Nasal congestion
• Itchy, burning and swollen eyes
• Raspy throat
• Peeling fingernails
• Stomach aches
• Yeast infection
• Ammonia toxicity from consumption, especially for those with liver, kidney or urea cycle diseases People who keep aquariums know that they have to remove the chloramine - or the fish die.

Chloramines are derivatives of ammonia by substitution of one, two or three hydrogen atoms with chlorine atoms. Monochloramine is an inorganic compound with the formula NH_2Cl. It is an unstable colourless liquid at its melting point of -66° temperature, but it is usually handled as a dilute aqueous solution where it is used as a disinfectant. The term chloramine also refers to a family of organic compounds with the formulas R_2NCl and $RNCl_2$ (R is an organic group). Dichloramine, $NHCl_2$, and nitrogen trichloride, NCl_3, are also well known.

Uses in water treatment

NH_2Cl is commonly used in low concentrations as a secondary disinfectant in municipal water distribution systems as an alternative to chlorination. This application is increasing. Chlorine (sometimes referred to as **free chlorine**) is being displaced by chloramine, which is much more stable and does not dissipate from the water before it reaches consumers. NH_2Cl also has a very much lower, however still present, tendency than free chlorine to convert organic materials into chlorocarbons such as chloroform and carbon tetrachloride. Such compounds have been identified as carcinogens and in 1979 the United States Environmental Protection Agency began regulating their levels in U.S. drinking water.

Furthermore, water treated with chloramine lacks the distinct chlorine odour of the gaseous treatment and so has improved taste. In swimming pools, chloramines are formed by the reaction of free chlorine with organic substances. Chloramines, compared to free chlorine, are both less effective as a sanitizer and more irritating to the eyes of swimmers. When swimmers complain of eye irritation from "too much chlorine" in a pool, the problem is typically a high level of chloramines. Pool test kits designed for use by homeowners are sensitive to both free chlorine and chloramines, which can be misleading

Chloramine-treated water has a greenish cast; the source of the colour is uncertain. Pure water by contrast normally is blue. This greenish color may be observed by filling a white polyethylene bucket with chloraminated tap water and comparing it to chloramine-free water such as distilled water or a sample from a swimming pool.

Situations where monochloramine is removed from water supplies

Many animals are sensitive to chloramine and it must be removed from water given to many animals in zoos. Aquarium owners remove the chloramine from their tap water because it is toxic to fish. Aging the water for a few days removes chlorine but not the more stable chloramine, which can be neutralised using products available at pet stores.

Chloramine must also be removed from the water prior to use in kidney dialysis machines, as it would come in contact with the bloodstream across a permeable membrane. However, since chloramine is neutralized by the digestive process, kidney dialysis patients can still safely drink chloramine-treated water.

Home brewers use reducing agents such as sodium metabisulfite or potassium metabisulfite to remove chloramine from brewing fermented beverages. Chloramine, like chlorine, can be removed by boiling. However the boiling time required to remove the chloramine is much longer than that of chlorine. Residual sodium can cause off flavors in beer (See Brewing, Michael Lewis) so potassium metabisulfite is preferred.

Chloramine can be removed from bathwater and birthing tubs by adding 1000 mg of vitamin C (as the ascorbic acid form) to a medium size bathtub (about 40 gallons of water).