

# NATIONAL ASSOCIATION OF WATER COMPANIES PENNSYLVANIA CHAPTER

## Fact Sheet

### Chloramine Disinfection of Drinking Water

#### Background

Chloramines are a combination of chlorine and ammonia. It is drinking water disinfectants that have been in use since the 1930's to effectively prevent waterborne diseases caused by bacteria, viruses, and other disease-causing organisms. Approximately one-third of all public water systems in the United States use it for residual disinfection. In a 1998 national survey, the U.S. Environmental Protection Agency (EPA) estimated that water systems serve drinking water containing chloramines to over 68-million people across the country. In Pennsylvania, 73 public water systems serve chloraminated water to more than 4-million people.

As disinfectants in drinking water, chlorine and chloramine are similar in many respects. EPA has approved both for use as residual disinfectants; neither poses health concerns to humans at levels used for drinking water disinfection. According to the Pennsylvania Department of Health, "based on currently available information, the levels of residual chloramines typically found in drinking water following chloramine treatment for disinfecting water supplies pose no apparent public health hazard." It should be noted, however, that some people who use drinking water containing chloramines or chlorine well in excess of EPA's standard of 4.0 mg/L could experience irritating effects to their eyes and nose. Some people who drink water containing excessive chloramines could experience stomach discomfort or anemia.

The principal reasons for use of chloramines are the reduction in potentially harmful disinfection byproducts (DBPs) and improved taste and odor. Due to health concerns about DBPs (trihalomethanes and haloacetic acids), EPA has established more stringent Maximum Contaminant Levels (MCLs) and monitoring requirements. Chloramines combine with naturally occurring organic matter to a much lesser degree than chlorine; therefore, its use allows utilities to meet the increasingly stringent DBP standards and improve the safety of the finished water. Also, according to EPA, "The ability of chloramines to disinfect and reduce chlorine taste and odor problems in water has been recognized since the beginning of the last century." With the use of chloramines, the aesthetic quality of the finished water should improve for most customers.

Although chloramines are weaker disinfectants than chlorine, it is more stable and maintains its disinfection capability longer throughout the water distribution system. As a result of this staying power, chloramine residuals need to be chemically removed from water that will be added to aquariums and fishponds; boiling or allowing water to stand will not remove these disinfectants. Like chlorine and many other substances, chloramines must also be chemically removed from water that will be used in dialysis machines.<sup>i</sup>

#### Chloramine Disinfection and the Pennsylvania American Water Company<sup>ii</sup>

Like most other community water systems, Pennsylvania American has been investigating options to decrease the formation of DBPs while continuing to provide high levels of protection against waterborne diseases. Its latest facility, the West Shore Regional Water Treatment Plant, is a state-of-the-art filter plant that was designed with both of these goals in mind. With the Pennsylvania Department of Environmental Protection (DEP) oversight and concurrence, it was built and has been operated to meet all current and anticipated microbiological requirements while reducing to the maximum extent possible the formation of DBPs. Within the plant, waterborne, disease-causing organisms are destroyed and removed by optimized filtration and

disinfection practices and natural organic matter is removed. Next, immediately prior to distribution, chlorine will be converted to chloramines to provide residual disinfection within the distribution system while minimizing the formation of undesirable DBPs. The use of chloramines will maintain the level of consumer protection from disease-causing organisms found in the source water.

Prior to construction or operation of any potable water treatment facilities, community water suppliers are required to obtain Public Water Supply permits from DEP. DEP issues such permits only after its review of any proposed treatment methods and the goals and limitations of the proposal. DEP staff also review the safety of any chemicals or additives to be used. Importantly, staff reviews the suitability of all proposed equipment and its operational requirements and determine that the proposed facilities can be effectively and reliably operated to produce finished water that meets all current Pennsylvania standards for safe drinking water. In the case of Pennsylvania American's West Shore system, the company has demonstrated the following actions to DEP's satisfaction:

- There is a need to change its treatment practices to meet increasingly stringent water quality standards;
- The proposed use of chloramines will achieve public health goals and produce water that meets current and anticipated standards with no known adverse side effects; and,
- They have the capability to operate the new treatment to meet those requirements.

As part of the implementation of a modified disinfection process, Pennsylvania American has developed and will initiate a thorough distribution system monitoring program. The resulting data will be reviewed by DEP to insure that the proposed changes are performing as expected.

For additional information, visit EPA's Web site titled, "Information about Chloramine in Drinking Water" at [www.epa.gov/safewater/disinfection/chloramine](http://www.epa.gov/safewater/disinfection/chloramine).

### **Update on Chloramine Litigation**<sup>iii</sup>

Two recent decisions associated with the Pennsylvania American Water Company's (PAWC) construction and planned operation of treatment plants utilizing chloramines as a distribution system disinfectant have possible implications on the prosecution and handling of future public utility complaints. The two decisions arise from interrelated proceedings wherein certain PAWC customers filed complaints with both the Pennsylvania Public Utility Commission (PUC) and the DEP alleging that PAWC's use of chloramines would cause adverse health effects and that public notice was insufficient under the Public Utility Code and the Safe Drinking Water Act. The bifurcated nature of the proceedings was a result of the PUC's and DEP's dual regulatory authority over water supply treatment and their distinct public notice requirements.

### **PUC Praises PAWC's Cooperation, Responsiveness**

On February 18, 2009, Administrative Law Judge (ALJ) Marlane R. Chestnut of the PUC issued an Initial Decision that denied complaints alleging PAWC had violated the Public Utility Code. At issue in this proceeding was whether PAWC provided reasonable and adequate notice to its customers of the plan to switch the disinfectant chemical used in the distribution system of one of PAWC's systems from chlorine to chloramine, whether PAWC's choice of treatment alternatives was prudent and appropriate, and whether water provided at the tap was suitable for all household uses.

Citing PAWC's at least one month advance notice to state officials, customers, hospitals, supermarkets, and other major users through e-mail, mail, website updates, telephone calls, and two public meetings, ALJ Chestnut ruled against the complainants and held that PAWC gave reasonable and adequate notice. ALJ

Chestnut then upheld PAWC's choice of treatment alternatives and the decision that water treated with chloramines is suitable for household use primarily based on the complainants' failure to present credible evidence to the contrary and on the rule that utilities are granted broad discretion to manage their operations.

In reaching a decision, it appears the ALJ considered PAWC's willingness to cooperate with the parties through its voluntarily delay in implementing the chloramines treatment and its voluntary settlement with the Office of Consumer Advocate in which it agreed to nitrification monitoring and additional lead testing. ALJ Chestnut "commended" PAWC for its "responsiveness to the concerns expressed by its customers, its restrained conduct throughout this litigation, and its willingness to undertake obligations pursuant to the settlement that would never have been ordered as the result of this proceeding."

#### Commonwealth Court Affirms Notice Requirements

Two months prior to ALJ Chestnut's decision, on December 9, 2008, the Commonwealth Court of Pennsylvania rejected a claim that the Safe Drinking Water Act required public notice of the DEP permits issued for the construction and operation of PAWC's chloramine-related treatment facilities to explicitly state that a change in the disinfection method was planned. *Pickford v. Pennsylvania-American Water Company*, 999 C.D. 2008 (Pa. Commw. Ct. Dec. 9, 2008). This decision would appear to provide utilities with a greater degree of protection by not imposing upon them onerous notification requirements.

#### The Appeal of Informal Letter Rulings

The *Pickford* decision also contained a ruling that certain informal agency responses are not actions subject to a right of appeal. According to the facts of the case, an individual submitted a complaint to DEP via its website expressing concern over the health effects of chloramines and asking the DEP to withdraw the permits or place them on hold. DEP responded via e-mail to the complainant stating it did not have any data that suggested the use of chloramines was harmful. The complainant subsequently appealed the DEP's e-mail response. The Court held that the e-mail response was not an action subject to a right of appeal because an informal letter of this nature does not affect property rights or privileges and only merely affirms the status quo of the approved permits.

#### National Association of Water Companies (NAWC)

The National Association of Water Companies (NAWC) [www.nawc.org/](http://www.nawc.org/) represents all aspects of the private water service industry including ownership of regulated drinking water and wastewater utilities and the many forms of public-private partnerships and management contract arrangements. The Pennsylvania Chapter consists of 10 member companies that provide safe and adequate drinking water service to approximately 3.1 million Pennsylvanians in 485 communities over 38 counties. In addition, three of our member companies provide wastewater service to approximately 155,000 Pennsylvanians in 24 communities over 7 counties.

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<sup>1</sup> <http://www.depweb.state.pa.us/southcentralro/cwp/view.asp?A=3&O=527432>

<sup>2</sup> IBID

<sup>3</sup> "Pennsylvania Water Law," by Michael D. Klein, Esq., Pennsylvania Section, American Water Works Association's "The Water News Source," Volume 45, No. 1, Spring 2009

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Pennsylvania Department of Environmental Protection

Rachel Carson State Office Building

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Harrisburg, PA 17105-2063

July 9, 2009

Secretary

717-787-2814

The Honorable Mary Jo White, Chairman  
Senate of Pennsylvania  
Senate Post Office Box 203021  
Harrisburg, PA 17120-3021

Dear Senator White:

Thank you for your letter regarding the planned use of chloramines by the Pennsylvania American Water Company (PAWC) as a residual disinfectant in their West Shore water system. I can assure you that the Department of Environmental Protection (DEP) has reviewed this proposal thoroughly, and we have determined that the use of chloramines by PAWC poses no threat to the public health of their customers.

While we understand and agree with the need for the public's concerns to be fully addressed, we are also concerned that much of the outcry over this issue may be based on misperception or misinformation. For example, contrary to what has been reported, chloramines have not been the subject of a great deal of controversy across the United States. While we are aware of isolated incidents of debate in Vermont and California, we found few other incidents.

Chloramines have been used as a drinking water disinfectant since the 1930's to ensure the water remains safe as it travels from the treatment facility to the customer. Approximately one-third of all public water systems in the United States use them for residual disinfection. The U.S. Environmental Protection Agency (EPA) estimated that water systems serve drinking water containing chloramines residuals to over 68 million people across the country. In Pennsylvania, 73 public water systems serving over four million people receive water containing these residuals. PAWC has experience with the use of chloramines as a disinfectant. PAWC has six other water systems across the Commonwealth that employ the use of chloramines.

Currently there are no bans on the use of chloramines for disinfection purposes, and DEP is not aware of any jurisdictions that have prohibited chloramines use. The only cases that were elevated to the court system were in San Francisco, California and Champlain Water Company, Vermont. The outcome of both cases was to conduct further research.

Regarding permitting, if a public water supplier decides to modify its operating permits, an application to amend the permit must be submitted to DEP. A notice is then published in the *Pennsylvania Bulletin* as required by DEP, which provides a 30 day public comment period. Permit approval is granted only after particular conditions are met. DEP received no comments



July 9, 2009

and issued with regard to the new West Shore Regional treatment facility the construction and operating permits on March 21, 2004 and March 21, 2006, respectively.

A reason PAWC plans to switch to chloramines is to lower the concentrations of known carcinogenic disinfectant by-products. Regulation of these known by-products is supported by long-standing research confirming their toxic effects. On the other hand, the scientific community has made no determinations regarding the by-products of chloramines. Please remember that this chemical has been used in systems across the country for nearly a century.

DEP believes that the use of chloramines as a residual drinking water disinfectant as proposed by PAWC will achieve public health goals and produce water that meets current and anticipated standards with no known adverse side effects. I have enclosed an EPA Q&A document that includes answers to the most frequently asked questions about chloramines. You can find this document and other information from EPA scientists and experts on EPA's Web site at: <http://www.epa.gov/safewater/disinfection/chloramine/>. Should you have any additional questions, please contact Lisa Daniels, Bureau of Water Standards and Facility Regulation, by e-mail at [ldaniels@state.pa.us](mailto:ldaniels@state.pa.us) or by telephone at 717-772-2189 or Jon Price, Legislative Director, by e-mail at [jonatprice@state.pa.us](mailto:jonatprice@state.pa.us) or by telephone at 717-783-8303.

Sincerely,



John Hanger  
Secretary

Enclosure



# Pennsylvania Fish & Boat Commission

Bureau of Fisheries  
Division of Environmental Services  
450 Robinson Lane  
Bellefonte, PA 16823  
814-359-5133

October 30, 2009

Mr. Daniel J. Hufton, P.E., Senior Director, Production  
Pennsylvania American Water Company  
300 Galley Road  
McMurray, PA 15317

Re: Pennsylvania American Water letter of Oct. 13, 2009 regarding chlorine and chloramine toxicity

Dear Mr. Hufton:

Thank you for your letter of October 13, 2009 to Dr. Tim Schaeffer. Your letter has been referred to me for response.

Our Division of Environmental Services confirms that both free chlorine and chloramines are quite toxic to aquatic life. Consequently, both compounds are used effectively as disinfectants. Chlorine is toxic to many aquatic organisms at concentrations less than 1 part per million, and we find that slightly higher chloramine concentrations are necessary to produce the same level of toxicity. We understand that combined chlorine (chloramines) is more persistent in water supply distribution systems, which makes use of this form of disinfection desirable at times. Greater persistence may also be a characteristic of chloramines if released into streams and lakes. The incomplete nature of fish kill data makes these data less useful in evaluating toxicity of chlorine and chloramines than laboratory toxicity data we examined.

Pennsylvania American's strict use of best management practices when dealing with both products is wise due to adverse environmental impacts of any disinfectant. This letter may assist you and others in understanding our position and is consistent with our mission to protect, conserve and enhance the Commonwealth's aquatic resources and provide fishing and boating opportunities. You may use this letter and statements we have made to represent our agency's position. We do not intend to offer a position with regard to which disinfectant may be most appropriate in your water supply systems.

We appreciate your interest regarding accurate portrayal of issues and protection of aquatic life. If you have any questions, you may contact me at (814) 359-5133.

Sincerely,

Mark A. Hartle, Chief  
Aquatic Resources Section  
Division of Environmental Services

c: J. Arway, T. Schaeffer, L. Young

**Our Mission:**

[www.fish.state.pa.us](http://www.fish.state.pa.us)

*To protect, conserve and enhance the Commonwealth's aquatic resources and provide fishing and boating opportunities.*



## Commonly Used Across Pennsylvania

Every day across Pennsylvania, four million people rely on tap water treated with chloramine for drinking, cooking, cleaning, bathing and other typical uses. That's one out of every three people in Pennsylvania. The water systems listed below deliver chloraminated water to their customers, with many providers using this proven disinfection method for decades:

County	Water System
Allegheny	Braddock Borough Water Authority
Allegheny	Harmer Township Municipal Authority
Allegheny	Monroeville Municipal Authority
Allegheny	Oakmont Borough Municipal Authority
Allegheny	Plum Borough Municipal Authority
Allegheny	Wilkinsburg-Penn Joint Water Authority
Armstrong	Gilpin Township Municipal Authority
Armstrong	Parks Township Municipal Authority
Bedford	Evitts Creek Water Company
Berks	Flying Hills Water System, Aqua Pennsylvania
Berks	Bern Township Municipal Authority
Berks	Reading Area Water Authority
Berks	Western Berks Water Authority
Berks	Shillington Municipal Authority
Berks	Wemersville Municipal Water Authority
Berks	West Reading Borough Water Authority
Berks	Boyertown Municipal Authority
Berks	Wyomissing Borough Water System
Berks	Onlelaunee Township Municipal Authority
Bucks	Bristol, Aqua Pennsylvania
Bucks	Bucks County Water & Sewer Authority
Bucks	Lower Bucks County Joint Municipal Authority
<b>Bucks</b>	<b>Yardley, Pennsylvania American Water</b>
Bucks	Bensalem, Aqua Pennsylvania
Bucks	Bristol Township, Water Department
Bucks	Warwick Township Water & Sewer Authority
Butler	Butler, Pennsylvania American Water
Chester	Uwchlan Township, Aqua Pennsylvania
Chester	Oxford Borough
Chester	West Chester, Aqua Pennsylvania
Chester	Kennell Square Municipal Water Works
Chester	London Grove Township Municipal Authority
<b>Clarion</b>	<b>Clarion, Pennsylvania American Water</b>
Clarion	Farmington Township
Delaware	Chesler Water Authority
Delaware	Bethel, United Water

Fayette	Pleasant Valley Water Authority
Fayette	Municipal Authority of Washington Township
Fayette	<b>Connellsville, Pennsylvania</b> American Water
Lawrence	<b>Ellwood City, Pennsylvania</b> American Water
Lawrence	New Wilmington Borough Water Department
Lebanon	Cornwall Borough Municipal Authority
Lebanon	Lebanon Water Authority
Lebanon	Fredricksburg Water Authority
Lebanon	West Lebanon Township Water Supply
Lebanon	Fort Indiantown Gap
Lehigh	Whitehall Township Authority
Mercer	Greenville Municipal Water Authority
Mercer	Shenango Valley, Aqua Pennsylvania
Montgomery	Halboro, Aqua Pennsylvania
Montgomery	Horsham Water & Sewer Authority
Montgomery	North Penn Water Authority
Montgomery	<b>Norristown, Pennsylvania</b> American Water
Montgomery	Audubon Water Company
Montgomery	Aqua Pennsylvania Main Water System
Philadelphia	Philadelphia Water Department
Westmoreland	Municipal Authority of Westmoreland County
Westmoreland	New Kensington Municipal Authority
York	Glen Rock Water Authority
York	Stewartstown Borough Water Authority
York	Windsor Borough Water Authority
York	Dover Township Water system
York	New Freedom Borough Water Authority
York	Dallasstown Water Authority
York	Red Lion Borough
York	York Water Company

Source: Pennsylvania Department of Environmental Protection