From: Calvino, Maria Soledad
To: Amato, Paul
Subject: RE: Inquiry about Chloramine
Date: Tuesday, January 19, 2016 1:17:00 PM

FYI

Protection or Poison?
Chloramination of Drinking Water
by Erin Brockovich

October 2010

Water utilities across the country are changing the way they treat our drinking water. They're switching from chlorine, the primary disinfectant used in drinking water systems for over a hundred years, to the alternative disinfectant chloramine at an alarming rate. But are they making a sound, informed decision? What are the health effects? Where are the studies to help us understand the impacts to our health and infrastructure?

The fact of the matter is chloramines are a terrible mistake. While utility companies often use chloramines as a matter of convenience, there are far safer alternatives. As a world-leading nation, we have to stop cutting corners where our health and safety are at stake.

Historically, drinking water disinfection with chlorine has been extremely successful in addressing bacterial and viral contamination. It has virtually wiped out waterborne diseases like typhoid fever, cholera, and dysentery. However, chlorine disinfection may also cause health risks. When chlorine is added to the water, it not only kills bacteria and viruses, but it also reacts with other chemicals dissolved in the water to form new compounds, known as disinfection byproducts. Some of these byproducts, such as trihalomethanes, are thought to cause cancer and pose other long-term health risks.

Chloramine, on the other hand, is a combination of chlorine and ammonia. While chlorine dissipates and evaporates into the air relatively quickly, chloramine is more stable and will last longer in the water system. The goal is to provide increased protection from bacterial contamination. Chloramine also happens to be the cheapest and easiest of the options available to water utilities. Yet even though the use of chloramine is convenient, it may not be safe.

Studies indicate chloramine causes more rapid deterioration of the municipal infrastructure and degradation of valves and fittings. In water systems that still use lead pipes or components, this causes lead and other metals to leach into drinking water and out of faucets and showerheads. The chemicals themselves may not cost much, but we can't afford their consequences.

On top of all these infrastructure and health problems associated with chloramine use, there is growing evidence that chloramine forms toxic byproducts as it disinfects. This also occurs with the use of chlorine, but recent studies indicate the formation of toxic byproducts in drinking water may be higher when utilities use chloramines. These studies also indicate that chloramine causes more dangerous byproducts than other treatment alternatives, such as ozone or chlorine dioxide.

Disinfection byproducts are created when the compounds used for disinfecting drinking water react with natural organic matter, bromide, or iodide. Research shows that the byproducts are highly toxic to mammalian cells like ours, and they're known to affect cells' genetic material, which can cause mutation or cancer. In studies, some of these byproducts, such as iodoacetic acid, have been shown to cause developmental abnormalities in mouse embryos. Other byproducts of chloramine use include the highly toxic human carcinogens hydrazine and N-nitrosodimethylamine (NDMA). Hydrazine is the primary ingredient in rocket fuel and is extremely toxic at very low levels in drinking water. NDMA is also a chemical used in the manufacture of rocket fuels. Both chemicals are a result of the chloramine's combination of ammonia and chlorine, a potentially deadly cocktail.

Amazingly, it's not even clear that chloramine's benefits are worth these risks. Chloramine is 200 times *less* effective than chlorine in killing e-coli bacteria, rotaviruses, and polio.

How many times do we have to hear water utilities complain that the EPA is making them adopt chloramines? *This is not the truth.* Time and time again, water utilities shift the blame from themselves and take the easy way out, pointing to some higher authority as responsible.

These utility companies are blaming chloramines adoption on the EPA Stage I and Stage II Disinfectants and Disinfection By-Products Rule (DBPR), which has been actively negotiated since 1992. These rules tighten drinking water regulations, requiring utilities to provide their customers with cleaner, safer drinking water. To support the science behind these regulations, well over $100 million in research has been conducted to better define the risks from microbial pathogens and disinfection byproducts.

The Stage II DBPR and the Long Term Enhanced Surface Water Treatment Rule are the second phase of rules required by Congress. Set to take effect in 2012, these rules strengthen protection against microbial contaminants and aim to reduce dangerous disinfection byproducts. The rule targets water systems with the greatest risk and builds incrementally on existing rules. Under the Stage II DBPR, systems will conduct an evaluation of their distribution systems to identify the locations with high disinfection byproduct concentrations. These locations will then be used as the sampling sites for Stage II DBPR compliance monitoring.

Utility companies are concerned that these new regulations are too expensive. To cut costs, many are choosing to adopt chloramine treatment. It's the cheapest way of meeting the EPA's new regulations, but it's one of the most dangerous ways of getting the job done.

There are several alternatives recommended by the EPA that do not involve adding more chemicals to our drinking water. All of the alternatives involve removing organic contaminants through enhanced coagulation or sedimentation, filtration, or carbon adsorption. Within those three areas of treatment, there are scores of readily available, real-world applicable options. Alternative disinfectants, such as ozone and chlorine dioxide, are better, but they too can cause the formation of other byproducts. All this demonstrates the need to effectively *remove* the bad stuff in our drinking water rather than trying to merely treat it with chemicals.

Collectively, we can stop the poisoning of our drinking water supplies. Speak up, and tell your water utilities, state officials, and the EPA, "We are informed, we understand the issue, and we do not want you to continue contaminating our water supplies." Cite the Cincinnati's experience with granular activated carbon (GAC) as an alternative.

In December 1978, Richard Miller became director of Greater Cincinnati Water Works, home to the EPA Research Center and Office of Administration and Resources Management. Miller spearheaded the creation and implementation of a vision that would provide Water Works customers with the high-quality water they desired at a price they could afford. In 1992, he implemented a post-filtration granular activated carbon process, which essentially vacuumed up the dangerous contaminants in water. Using this process, Miller eliminated the need to sully Cincinnati's water with chlorine, chloramine, or any other dangerous chemicals.

Eighteen years later, Mr. Miller explains, "It is better to remove contaminants by adsorption with GAC instead of adding chemicals that might have unintended consequences. Science is continually identifying additional chemicals in the drinking water supply, often in minute concentrations. While evidence may be lacking that many may pose no significant threat to public health, removing them as an additional benefit of treatment for other purposes is advantageous."

From: Amato, Paul
Sent: Tuesday, January 19, 2016 12:27 PM
To: Keener, Bill
Cc: Calvino, Maria Soledad
Subject: Inquiry about Chloramine

Bill,

A call came in this morning (not to me) from a Mike Fitzgerald at the Stockton Record asking about EPA's apparent position that "chloramines are safe" in drinking water. I don't have much context on this and our resident expert Bruce Macler cannot be reached so we are trying to track someone down at HQ that can respond to this. We may need to contact the reporter directly to get him to be more specific. Regarding protocol, should we contact him directly of have Soledad make the call since Michele is out today? The reporter has a 5:00 deadline.

Paul