



May 2016

Volume 4 Issue 5

A publication of AMERICAN STRUCTURES, INC.

“Dedicated to being the trusted supplier of Bolted, Stainless Steel Storage Tanks”

Flint water crisis: What’s in that contaminated water

What does it mean that residents of Flint, Michigan, consumed water with dangerously high levels of lead for years before it was recognized as a problem?

What does it mean that residents of Flint, Michigan, consumed water with dangerously high levels of lead for years before it was recognized as a problem? Here are some fast facts about just what’s in the Flint water and how it came to pass.

How was this discovered?

In the summer of 2014, LeeAnne Walters noticed that her son would get a rash every time he got into the swimming pool at their home in Flint, Michigan. By December that year, she had stopped letting any of her children drink the water coming out of her tap and called the city’s utility department to take a look. Walters had helped to set in motion the discovery that the city’s water was seriously contaminated.



The inspector’s reading of the Walter home found that the water contained lead levels at 104 parts per billion (ppb) – anything over 15 ppb is considered unsafe by the Environmental Protection Agency (EPA). When they tested the water again in March 2015, they found it had lead levels of 397 ppb.

How did this happen?

The city previously bought its water from Detroit (where lead levels are 2.3 ppb) but as of April 2014, it switched its source to the Flint river to cut costs. The measure was always intended to be a short-term fix while city planners waited for a new pipeline from Detroit’s Lake Huron to be built. The water from the Flint river was highly corrosive and therefore damaged the lead pipes that it flowed through, but officials did not implement corrosion control to prevent lead from leaching into the water.

Almost immediately, citizens began to make complaints about the quality of their water. Since then, Virginia Tech and the Michigan department of environmental quality have together taken 271 samples.

How bad is it in Flint?

The average reading was 11 ppb – over two times higher than the EPA guidelines.

Is that the highest reading?

No. The highest reading made by the Virginia Tech researchers

observed lead levels of 13,000 ppb – anything above 5,000 ppb is deemed toxic or hazardous waste by the EPA.

What are government guidelines?

The ideal level of lead in drinking water according to the EPA is “zero”. A 2012 report from the CDC explains why this is: “no measurable level of blood lead is known to be without deleterious effects, and because once engendered, the effects appear to be irreversible in the absence of any other interventions, public health, environmental and housing policies should encourage prevention of all exposure to lead.”

What are the health effects?

Long-term exposure for infants and children can lead to “delays in physical or mental development; children could show slight deficits in attention span and learning abilities”. The EPA also warns that adults might experience kidney problems or high blood pressure.

Have people in Flint been exposed?

Yes, it’s now assumed that children younger than five who live in Flint have been exposed – all 8,177 of them, according to records from the Census Bureau.

Is there any evidence children have been affected?

Yes. In September 2015, doctors from the Hurley Medical Center presented findings of a study about the effects on children younger than five. The doctors analysed the blood of 840 children who had visited the medical center in 2013 and again in 2015 (ie before and after the change in the city’s water supply). They found that lead levels in the children’s blood had risen from 2.1% to 4.0% – a statistically significant rise. When they repeated these tests with children that weren’t from Flint, they didn’t notice the same increase over the same period.

Source: <http://www.theguardian.com/us-news/2016/jan/22/flint-water-crisis-contaminated-water-contains>. Photograph: Ryan Garza/AP

GREEN BAY PLANS NEW TESTS FOR LEAD IN DRINKING WATER

Green Bay will test only 7 percent of the city’s known lead water supply lines this year when determining whether its drinking water meets federal health standards. The city’s water utility is in the process of collecting samples from 100 homes out of the 1,742 known to get water from lead pipes. That’s the minimum amount of testing required by federal law to determine the effectiveness of the utility’s efforts over the past two years to minimize lead levels in drinking water. If no more than 10 of those homes being tested have unsafe levels of lead, the city’s water will be in compliance with health standards and the utility could be off the hook for any more remediation.

Source: <http://www.greenbaypressgazette.com/story/news/local/2016/03/17/green-bay-water-utility-retesting-lead-levels/81859402/>

T3: Tanks, Tips and Trends...

THE INVENTION OF STAINLESS STEEL

Harry Brearley (1871-1948) invented stainless steel as a way of improving the quality of gun barrels. He had been asked to help reduce the amount of corrosion occurring when rifles were fired.

Combustion, moisture and the gases produced as the weapons discharged all combined to corrode the inside and reduce the efficiency of the guns. Harry was born in Sheffield - historically one of the main English steel making and steel producing towns. With such a large commercial involvement there was a great need to develop new materials and Brearley worked in the laboratories of Thomas Firth & Co. of Sheffield.



He tried adding a variety of other metals to create a steel alloy that had better resistance and knew of the effect that adding chromium to steels had - this was already being used in the manufacture of aeroplane engines and Brearley found one alloy that was dif-

ficult to examine microscopically because the etching processes used to prepare the samples for examination were far less effective than usual.... surely an alloy with better corrosion resistance. Stainless steel now has around 12% of Chromium added - so how does this make a difference?

Iron atoms - which of course are the main component of steel can form into several different lattice structures and the configuration into which they shape themselves gives different properties to the materials. The molecules that interact with the surface of materials must be able to fit into suitable gaps in the lattices and elements can be used in a "designer-way" to restrict this interaction. The process of Chromium plating for instance reduces the available spaces for oxygen molecules to interact with a lattice of iron molecules. It is this understanding of material properties that now allows the manipulation of alloys. In Brearley's time, as now, there may always have been the fortunate experimental combination - followed by astute observation - on which more detailed work can be built. It is perhaps not surprising therefore that the addition of Chromium can affect the properties of what might otherwise be a totally different material.

Source: <http://www.design-technology.info/inventors/page5.htm>

TRICHALOMETHANES: WHAT ARE THEIR HEALTH EFFECTS AND HOW ARE THEY PRODUCED IN TAP WATER?

Here in the United States, we have been adding chlorine to our water supplies since the early 1900's. Although chlorine disinfection was a great step forward in ensuring the safety of our public water supplies, it also has some serious negative side effects, in



particular the formation of trihalomethanes (THMs). Today we're going to talk about how trihalomethanes are created in water and the health effects associated with being exposed to the contaminants.

How are trihalomethanes created in water?

Trihalomethanes are created when chlorine interacts with organic matter in water. Because surface water supplies like rivers and lakes generally contain a high concentration of organic matter, THMs are most prevalent in homes that get their water from those supplies.

The concentration of trihalomethanes in your water depends on a number of different factors, including where your water supply comes from and the amount of chlorine that's added to your water supply at any given time of the year.

How are people exposed to trihalomethanes in water?

One of the biggest issues with THMs in water supplies is that there is more than one way to be exposed to them. Not only can you consume THMs by drinking water that's contaminated with them, but your body can also absorb them through the skin and you can breathe them in when steam is produced from hot showers or washing dishes.

What are the health effects of trihalomethanes in water?

The health effects associated with being exposed to THMs in

water are most often seen after long-term exposure to the contaminants. This makes them especially problematic, because you might not know that they are affecting your health until it's already too late. Some of the most common health effects associated with long-term exposure to THMs includes:

- Increased risk of certain cancers, such as bladder and colon cancer
- Reproductive issues such as miscarriages, birth defects and low birth rates
- Damage to the heart, lungs, kidney, liver and central nervous system

How can you remove trihalomethanes in your home's water supply?

Because of the many different ways that you can be exposed to THMs, the best way to remove them from your home's water supply is to install a whole house filtration system. Unlike point-of-use filtration systems, a whole house filtration system will remove THMs as soon as water enters your home, which will diminish their effects on drinking, showering, dishwashing and any other activity that you use tap water for on a daily basis.

Source: <http://ncwaterconsultants.com/water-treatment-blog/trihalomethanes-what-are-their-health-effects-and-how-are-they-produced-in-tap-water/> photo credit: Lomo-Cam via photopin cc

Why Stainless? Why Bolted?

Bolted stainless steel tanks do not require coating and are fully recyclable, making them an environmentally-friendly choice for storage. By using a stainless steel tank, you're guaranteed a maintenance-free storage facility and years of use. In fact, bolted stainless steel tanks, designed to meet stringent water standards, have a product life expectancy in excess of 40 years or more.

CT Water, Public Water Supply
Griswold, CT
33,000 gallon
Potable Reservoir



T3: Tanks, Tips and Trends...