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Is Your Water Safe to Drink?

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35-acre Raw Water Storage Reservoir - Franklin, TN

For most of us, a sip of refreshing cold water is within reach of an outstretched arm. We should feel fortunate, especially considering that 1.1 billion people in the world lack access to water that is safe enough to drink. We might feel even more fortunate knowing that every year 1.6 million people die from water related diseases. [1]

Fortunate, however, is not likely how you will feel after reading this article. Numerous recent studies reveal a frightful truth: many of us in the United States are drinking tap water laced with 21st century poisons. In our highly developed nation, problems with our drinking water abound: water treatment systems are in violation of the law; the law is inadequate; officials are negligent in enforcing the law; our pipes are antiquated; and treatment technology is outdated. Any of us could suffer the consequences.

The goal of this article is twofold: to heighten awareness of the toxicity of many sources of tap water in the U.S., reviewing the causes and consequences; and, to demonstrate how geomembranes that are NSF 61 approved for potable water are being applied as solutions.

Recent Studies

In 2009 and 2010, *The New York Times* published a series called, “Toxic Waters”, composed of articles that discuss the pollution of American waters and the regulators’ response. According to *The Times*, federal data shows that more than 20% of the nation’s water treatment systems have violated key provisions of the Safe Drinking Water Act. [4] This is the law that requires municipalities to deliver safe tap water to local residents. But, EPA (Environmental Protection Agency) data shows that since 2004, parts of every state in the U.S. have violated the Safe Drinking Water Act. Worse news yet: little or nothing has been done about it. [4]

For example, since 2004, tests of drinking water in Ramsey, New Jersey, have detected illegal concentrations of arsenic and the cleaning solvent, tetrachloroethylene, both known carcinogens. In the state of New York, *The Times* found that since 2004, 205 water systems have broken the law by delivering tap water that contained illegal amounts of bacteria. But, according to federal data, Ramsey was not fined for its water violations and only three systems in New York were penalized for bacteria violations. [4]

The problem, apparently, is that enforcing the Safe Drinking Water Act isn’t a federal priority. *The Times* quotes a longtime Environmental Protection Agency (EPA) enforcement official who asked to remain anonymous, “I proposed drinking water cases, but they got shut down so fast that I’ve pretty much stopped even looking at the violations. The top people want big headlines and million-dollar settlements. That’s not drinking water cases.” [4]

In the same article, David Uhlmann, who headed the environmental crimes division at the Justice Department until 2007, is quoted as saying, “There is significant reluctance within

the EPA and Justice Department to bring actions against municipalities, because there's a view that they are often cash-strapped, and fines would ultimately be paid by local taxpayers." Mr. Uhlmann, who now teaches at the University of Michigan Law School, went on to say, "Some systems won't come into compliance unless they are forced to. And sometimes a court order is the only way to get local governments to spend what is needed." [4]

Spend what is needed, or Suffer the consequences . Canadians have struggled with water issues, too. In May of 2000, in Walkerton, Ontario, a rural town not far from Toronto, seven people died and 2,500 (half of the small town's population) fell ill. A highly dangerous strain of E. Coli bacteria from farm runoff seeped into the town's water supply through a well that was known to be faulty for years. [3] Just before that, in the fall of 1999, an E. Coli outbreak sickened almost 1,000 people who had attended the Washington County Fair in New York state. Two people died and many developed lasting health complications. The cause of the outbreak was traced to a contaminated well on the fairgrounds. [6] In 1992, in Milwaukee, Wisconsin, 54 people died and 400,000 became ill from an outbreak of cryptosporidiosis – a parasitic disease that spread through contaminated water coming from one of the city's two water purification plants. [2]

In 2003, the Natural Resources Defense Council (NRDC) conducted a study called "What's on Tap", to review the quality of drinking water in 19 U.S. cities. The findings are supportive of discoveries made by *The Times*. The NRDC report showed that though most cities have good or mediocre tap water, and some, like Chicago, have excellent tap water, others but it found that several cities are failing badly. Albuquerque, Fresno and San Francisco have tap water that is, according to Dr. David Ozonoff, a nationally known expert on drinking water and health issues from Boston University School of Public Health, "contaminated enough to pose potential health risks to consumers." [7] Pregnant women, infants, children, the elderly and people with compromised immune systems are the most vulnerable.

The NRDC blames antiquated delivery systems and treatment technology for the failing water quality, revealing that many cities rely on systems developed in the 20th century. Aging pipes can break, leach contaminants into the water they carry and breed bacteria.

Furthermore, when many of our water treatment systems were built, they were designed to filter out particles in the water and kill some parasites and bacteria, but they fail to remove all the chemicals commonly used today. [7]

According to *The Times*, the EPA estimates that the U.S. currently uses about 60,000 chemicals, only 91 of which are monitored by the Safe Drinking Water Act. Since 2000, no new chemicals have been added to the Safe Drinking Water Act. In the past decade, however, independent scientists and government sources have found through research that at least hundreds of the chemicals not currently monitored by the act are associated with a risk of cancer and other diseases at small concentrations in drinking water. Research has also proven that some chemicals that *are* regulated by the Safe Drinking Water Act pose risks at much smaller concentrations than was previously known [5]. Hence, even if your tap water is considered legal, it could be making you sick.

Researchers for both NRDC and *The New York Times* also found that many people in charge of water quality in municipalities have little or no experience to prepare them for their jobs.

Solving the Problems

Tackling the drinking water crisis is a profound challenge. Never mind the scope of work that needs to be accomplished globally, there is overwhelming work to be done in our own backyards. Ensuring that every household in the United States has clean and safe water, requires that we focus on all of the following: protecting lakes, streams, reservoirs and wells from pollution; rehabilitating and maintaining failing pipes; modernizing water treatment facilities; and, holding municipal employees and public officials responsible for their jobs.

The Role of NSF 61 Approved Geomembranes for Potable Water

E. Coli bacteria entered the water supply in Walkerton, Ontario because the water did not have sufficient contact time with chlorine in the treatment process. The Ontario government responded to this tragedy by changing regulations across the province and mandating water treatment facilities to ensure all water has a certain amount of chlorine contact time in the water treatment tanks. Engineers started specifying the use of NSF 61 approved potable water (PW) geomembranes as curtains in existing and new water treatment tanks throughout the province to increase chlorine contact time. Certain states in the U.S., including California and Texas are also tightening standards for water treatment processes.

Geomembranes approved for contact with potable water offer smart solutions to improve water treatment, preserve and protect our drinking water supply, and increase the distribution of clean water in hard-to-reach places.

Curtains and Baffles for Potable Water Tanks

Tanks that contain drinking water are typically made of steel, plastic, concrete, brick, wood, fiberglass or stone. Water stored in these tanks undergoes a chlorination process to kill any bacteria, viruses and algae in preparation for human consumption.

PW geomembrane fabrics are used to make baffles or curtains in these tanks. The baffles can act as a wall and the curtains can be installed in the form of pinwheels. Both function to increase the time that the water is in the tank, prolonging contact with chlorine in the treatment process. Once the water is treated, it passes through an outlet pipe in the tank and is ready for consumption.

Liners for Tanks or Ponds

Potable water geomembrane fabrics also are used to line tanks that contain drinking water. A geomembrane liner can be used to line a tank that has been in service for numerous years and is suffering from cracks or other deficiencies caused by its age.

These liners also can be used in ponds if they are failing because of fissures in the earthen basin of the pond. They can be used in concrete reservoirs because of cracks in the concrete, too. In these applications, the liner can prevent the loss of hundreds of thousands of gallons of treated water each month, which prevents increased costs to consumers.

Floating Covers for Raw Water Reservoirs

Water in raw water reservoirs is vulnerable to contamination by airborne particles, bird droppings, dead animals and pollen. Water reservoirs also are susceptible to contamination by terrorist acts, a potential threat that has merited more attention in recent years.

A floating cover made from potable water geomembrane fabric can be used to protect the water supply, to prevent the loss of fluid due to evaporation and to block off sunlight and prevent algae bloom. Floating covers also reduce the demand on water treatment chemicals because the water supply has been protected prior to the treatment process. They also prevent the production of trihalomethane (THM) type compounds such as chloroform, which result from the combining organic substances with chlorine.

Drinking Water Bladders

Potable water geomembranes can be fabricated to form a portable “bladder” or containment vessel that can be dropped into remote locations for emergency drinking water supplies, or simply to make drinking water available in areas where it is not. The bladders can incorporate filtration systems to process “dirty” water and transform it to clean potable water. Drinking water bladders range in size from 5 gallons to 100,000 gallons.

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For more information about XR® PW Geomembrane Systems please contact **Bill Shehane** by phone at **(330)262-1111** ext. **3003** or email at bshehane@seamancorp.com



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