

Draft Testimony
H.33 Municipal Government: Regulations: Surface water use
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Robert E. Dufresne
President Dufresne Group
Professional Engineer and process designer of the Barre and Montpelier Water Treatment Facilities. Managed the development of the Source Protection Plan for Berlin Pond and the Orange and Dix Reservoirs.

I want to summarize my comments today as follows:

1. In the water industry, our objective is to provide safe water to the customers. We do this by creating and maintaining multiple barriers to prevent contaminants from reaching our customers. This multi-barrier approach will not guarantee we will always have safe water but it increases the probability that we will meet our goal. But we can never be 100% confident the water is safe in all regards regardless of the technological barriers we construct. Loss of one of the barriers reduces our confidence in the safety of the water.
2. There are a vast number of contaminants present at some concentration in all waters. It is important to understand, we never test for many of these contaminants. For instance, we know that Giardia Lamblia cysts and Cryptosporidium oocysts are both dangerous pathogens that can survive normal chlorination, but generally we don't test for these cysts. Also, we don't routinely test for the contaminants that we know are present and that we know cause health effects. For instance, although we know disinfection byproducts are harmful, we test for these contaminants only on one day in 100 days and only at one or two locations.
3. Most Vermont surface water treatment facilities are well suited to the task of providing safe water to customers but most of these Vermont facilities have been in operation for at least two decades. These facilities represent the technology of twenty years ago and were not designed to remove all known contaminants and certainly cannot remove all contaminants known to exist. Some contaminants can pass through the treatment process and are delivered to customers without the operators ever knowing of the contamination event.

How do we set up these barriers to confidently provide safe water to our customers? Generally there are three ways a water supply is protected.

1. The first barrier is source selection. We need to select the highest elevation most protected source supply with the least number of potential sources of contamination. The second barrier once we select the source of supply is to protect it from contamination caused from natural events and development. Source protection for surface supplies is accomplished through ownership and control of the shoreline and as much of the drainage area as economically feasible. Restricting access to the water, the shoreline, and susceptible portions of the watershed are crucial to

maintaining this barrier to prevent contamination to our drinking water supplies. Source water protection is a process that is defined in detail in the Source Protection Plans required for all Vermont public water supplies. In addition to source protection, there are other physical barriers such as filtration to remove contaminants and disinfection to inactivate biological contaminants but importantly these processes do not remove or inactivate 100% of the contaminants.

Perhaps the most significant issue when considering source water protection is to prevent unauthorized access to the source of supply. Most water purveyors restrict all access within a certain radius around the intake – typically several thousand feet. Any unauthorized access within the radius is enforced regardless of the perceived intent. Consider the loss in security when allowing access to and directly over the intake structure? How can a public works person determine the intent of an individual? Are those people in a boat or ice shanty near the intake fishing or engaging in willful contamination of the water supply? If willful contamination sounds like a completely unlikely concept, doesn't pressure cooker bombs going off during the Boston Marathon sound just as unlikely?

2. The second barrier relates to the water quality. One typically thinks that public water supplies must test for everything all the time. We must if we are calling this safe water right? Actually, we continuously test only very few parameters and most of these parameters do not pose immediate health effects. In Vermont, we typically only continuously test for chlorine residual, pH, and turbidity. Other parameters such as Coliform Bacteria are tested for monthly and Synthetic Organic Compounds (SOC's) or Volatile Organic Compounds (VOC's) are tested only quarterly or in some cases on a three year routine. In addition we only test for some VOC's and SOC's but many more exist. How do we provide assurance that the water is safe to drink? We make assumptions that using multi-barriers to protect and treat the water provides theoretical assurance as confirmed by the very limited testing that the water is safe. Could we see a willful contamination event coming at us from contamination of the source with a colorless odorless nerve agent? Unfortunately, we would never see it coming. Our only defense for such a willful contamination event is protection of the raw water source of supply by restricting access near the intake.
3. The third barrier is treatment. There is a common misconception that we don't need to worry about the water quality of the water supply because we have a state of the art water treatment facility. For instance, the Montpelier facility is one of the best in the State but it is not dissimilar to other facilities serving other communities from surface water. These Vermont facilities includes unit operations that are suited for removal of particulates and microbial contaminants. Disinfection inactivates well over the 90% giardia lamblia cyst inactivation requirement without causing significant disinfection byproducts. These Vermont water treatment facilities have performed well over the past several decades and will likely serve well over the next two or three decades with normal equipment maintenance and replacement. But these facilities do not perform beyond their capabilities. There are contaminants that

cannot be removed by these unit operations at the plant such as petrochemicals, pharmaceuticals, and organic contaminants.

We must remain vigilant as there are threats that could jeopardize the customer's water quality in spite of having surface water treatment facilities. Some of these issues are due to natural changes in the environment and some directly due to development activities within the watershed. If zebra mussels reach the source of supply, zebra mussel veligers can easily pass through the intake screen and attach to the inside of the raw water piping grow to such a density that they can significantly restrict the flow to the water treatment facility. These mussels thrive in Lake Champlain and are already in the Winooski River and moving further upstream. With fishing allowed in surface water supplies, the simple act of dumping out a minnow bait bucket containing zebra mussels could start a similar infestation in the raw water supply.

As raw water supplies are open to recreation, development in the watershed is likely to increase which brings more use of the watershed; more cars and trucks with some making heating oil deliveries. More gardens that need to nitrogen and phosphorus. This increased use of water supplies increases the risk of accidental contamination by users. However, the greatest threat would be the willful contamination of the water supply near the intake with a contaminate that can completely pass through the treatment facility undetected.

To summarize, the key issues I raise in my testimony include:

1. Allowing recreational use of the pond, shoreline, and watershed removes a key barrier to providing safe water to customers. The most significant is the inability to ascertain the intent of unknown individuals in the vicinity of the intake and the lack of authority to restrict any activity near the intake. In my opinion, this is the single most significant reason to control the area around your water supply.
2. We do not test for every known contaminate continuously. In fact, most all the water reaching our customers has never been tested for contamination. Extremely toxic chemicals can pass undetected through a water treatment facility undetected.
3. A typical water treatment facility does not assure that water will be safe 100% of the time. Even the best most technologically advanced facilities cannot provide such assurance regardless of the cost. There are known contaminants that cannot be removed at any of the water treatment facilities in Vermont.

Respectively submitted,

Robert E. Dufresne, PE
Dufresne Group
54 Main Street
Windsor, Vermont 05089
802-674-2904