

Changes in our drinking water during ‘the outage’, with the penstock shut down ...

Blue Lake has been our drinking water source since 1984. Before that Indian River was the primary source. During the final stages of raising the dam we have to shut down the water flow from Blue Lake and we are temporarily using Indian River water as our water source again.

Blue Lake water is pristine; unusually clean by natural water standards. When the City of Sitka draws its drinking water from behind the dam, only a small amount of chlorine needs to be added to the water to meet regulatory requirements. This is because the water has very little in it that reacts with and consumes the chlorine and the water from Blue Lake spends several hours in the transmission main between the Blue Lake Water Treatment Facility and the entry point to the public water distribution system, by the National Cemetery. Proper disinfection is a complex process, a combination of free chlorine concentration and time that changes with water quality parameters like pH and temperature. Chlorine is more effective at lower pHs and at warmer temperatures.

Based on the water’s pH and temperature a required contact time, CT (free Cl concentration in mg/L at the entry point to the distribution system x Time in minutes after Cl addition to the entry point), is calculated. This required CT must be met at all times to assure proper disinfection of the water and to meet federal and state standards. Additionally, we are required to maintain a detectable chlorine residual at all points in the distribution system at all times. This will assure the water is safe for consumption even if it comes in contact with minor contamination like bacteria on our hands or on the end of our kitchen faucets.

Maintaining a disinfection residual throughout the distribution system is simple with Blue lake water. Once the small immediate chlorine demand is satisfied the remaining chlorine has basically nothing to react with and very very slowly decays as the water flow through the system or is stored in the tanks.

Due to construction of to the dam and tunnels, the City is now temporarily - for approximately 60 days, drawing water from Indian River at the site of the previous water treatment facility. Indian River water’s water quality is more complex, more typical for natural waters with many components in it that react with and consume chlorine. So, Indian River water has a larger demand for chlorine compared to Blue Lake water. Therefore more chlorine must be added to achieve the required residual at the entry point. Also, since Indian River is so close to town, there is not as much “contact time” between the injected chlorine and the entry point to the public water distribution system, near the new bus turn-around on Indian River Rd. Required CT is a product of Cl concentration at the entry point and time. Because of these factors, federal and state drinking water regulations require that the City add more chlorine to the water to combat microorganisms that could be harmful to public health.

In drinking water disinfection there is an immediate chlorine demand and a longer slower demand. As stated above with Blue Lake’s pristine water there is a small immediate demand and nearly a non-existent longer slower demand – once the initial demand is satisfied there is very little drop off in residual chlorine concentration. Typical of river water, Indian River has a higher immediate demand and a longer lasting slow demand as the water flows through the distribution system and is stored in the tanks. So, not only do the water treatment operators have to assure there is enough chlorine in Indian

River water leaving the treatment plant to meet the CT requirement but they have to assure there is enough chlorine to maintain a residual throughout the distribution system – in some cases days after the water has passed by the entry point.

So if it seems like there is more chlorine in the Indian River water, that's because there is.

State and federal drinking water regulations include a maximum allowable chlorine residual of 4.0 mg/L. Chlorine concentrations are constantly monitored at two locations in the Indian River temporary treatment plant and at a sample station located at the Fire Hall as well as grab sampled at multiple sites throughout the system daily. Chlorine concentrations leaving the treatment plant commonly range between 1.4 and 2.6 mg/L and at the Fire Hall monitoring site have ranged between 1.2 and 2.2 mg/L. Daily, morning and evening grab samples in the vicinity of Halibut Point Rec Area have been ranging between 0.4 and 0.8 mg/L and similar at the Gary Paxton Industrial Park; a longer slow chlorine demand of over 1 mg/L as the water travels out towards the ends of the system. This demand changes with storm events and water quality changes; it is continually being monitored by our water operators.

Another noticeable difference between our Blue Lake water and the Indian River water is the color. During heavy rain events, the Indian River picks up "color" from the natural organic matter upstream. As the river flow decreases the color recedes quickly. Our temporary filtration equipment is fantastic at removing particulates, but it is not designed to remove color dissolved in the water. Before 1984 when Indian River was the primary community water source short duration increases in color were common.

Indian River water is filtered through microfilters with 0.01micron pores. These filters are excellent at filtering out dirt and microorganisms such as Giardia. The filters have been consistently producing water at a very low turbidity of 0.03 or 0.04 NTU regardless of how 'dirty' the river is running during storm events. Note that Blue Lake water is commonly in the 0.2-0.5 NTU range; 10 times higher than that produced from the current temporary plant.

Proper chlorination, meeting CT and maintaining a residual throughout the distribution system, assures no total coliform bacteria or viruses survive in our distribution system. A minimum of ten bacterial samples are tested throughout the far reaches of the distribution system each month. All samples have been negative for total coliform bacteria.