

# Sebago Lake Water Treatment Facility

The Portland Water District's Sebago Lake Water Treatment Facility treats on average 21.5 million gallons of water a day. Once disinfected, the water travels through 1,000 miles of pipeline before being delivered to an estimated 53,000 residential and business services in Greater Portland. Since its construction in 1994, the plant has treated water through a combination of ozonation and chloramination. A 17-month, \$12-million project was recently completed updating the ozone disinfection system and installing a new UV water treatment system. This sustainable, forward thinking process design incorporated a new UV system into the existing plant, allowing the District to receive a \$300,000 competitive grant from the Efficiency Maine Trust Competitive Program. As a result of these energy efficient upgrades, an annual electricity cost savings of \$150,000 is expected.



## Project Highlights:

- Plant is the second largest UV water treatment facility in New England
- State-of-the-art technology meets EPA's Safe Drinking Water Act Long Term 2 Enhanced Surface Water Treatment Rule
- High efficiency ozone treatment system provides long term energy savings

## Why was UV treatment installed?

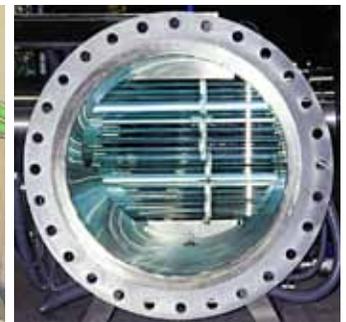
As a result of new federal regulations, additional treatment is required for purification. Federal regulations focus on the pathogen *Cryptosporidium*. During a two year monitoring program PWD never detected *Cryptosporidium* in the water; however, the new treatment provides additional levels of protection from potential contamination in the future. UV treatment has been used for drinking water disinfection in the U.S. since 1916 and is proven to be effective at inactivating *Cryptosporidium*.

## How does UV treatment work?

During the UV water purification process water is sent through units equipped with UV lamps. As the water is exposed to the UV light, molecular bonds in the DNA of viruses and bacteria are broken down, rendering the bacteria harmless and unable to reproduce.



Two-14-ft., 84-lamp UV units are installed in an underground chamber. Each UV unit connects to a 48-inch pipe and has the capacity to treat the Plant's full capacity of 52 MGD.



UV lamps are encased in quartz sleeves.



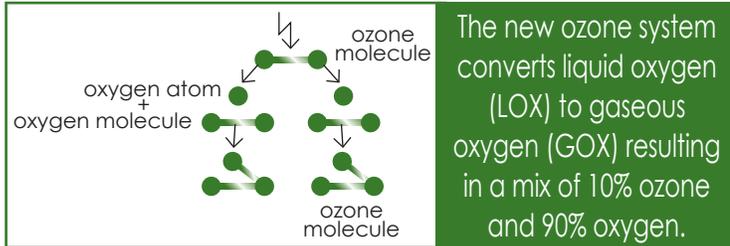
**Portland Water District**

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## Ozone Disinfection

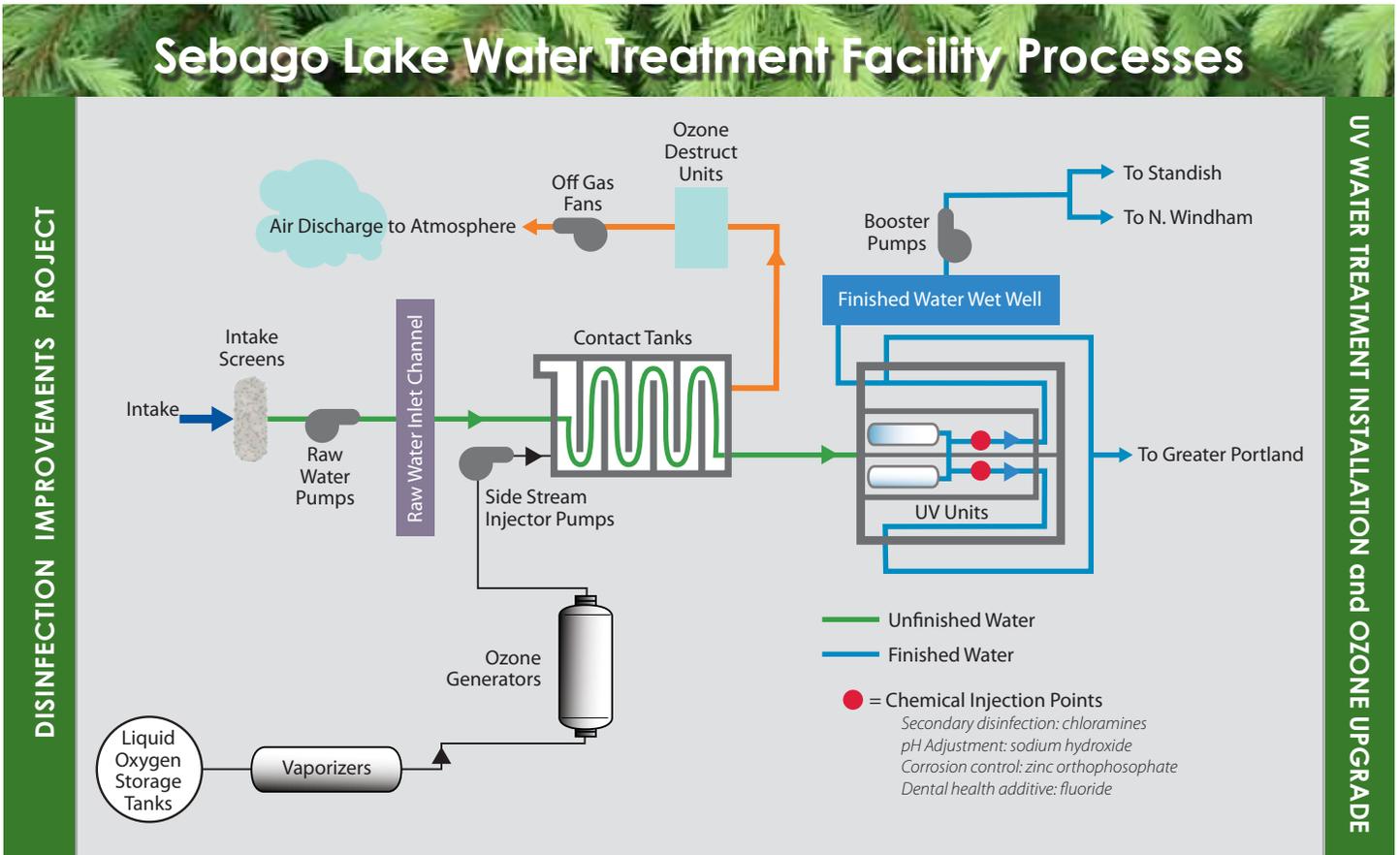
Ozone is a powerful disinfectant that kills potentially harmful microorganisms and is 99.99% effective against viruses and 99.9% effective against Giardia.

During the past two decades, drinking water treatment technology has advanced dramatically. More efficient equipment and a liquid oxygen system replace a complex and energy-intensive process that created ozone out of ordinary air.



### How does ozone treatment work?

Ozone generators equipped with aluminum lined glass tubes called "dielectric tubes" zap oxygen with high voltage power to split molecules into separate oxygen atoms. Some of these atoms then combine with other oxygen molecules to form ozone. Ozone is then injected into the water in the contact tanks. As ozone comes in contact with bacteria, it breaks down the cell wall and destroys it. By the time the water reaches the end of the contact tanks, disinfection is complete and the ozone has converted back to oxygen.



Design: CDM Smith | Contractor: D&C Construction |  
 UV Equipment: Wedeco | Ozone Equipment: Ozonia

Project Funding: Efficiency Maine and  
 State Revolving Loan Fund

