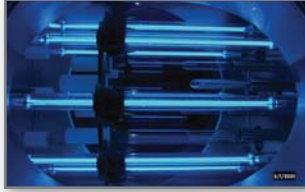


### UV Reactor Information

- Manufactured by Trojan UV in London, Ontario, Model 8L24
- Reactors are constructed of 316L stainless steel
- Each reactor weighs 1,500 pounds
- Each reactor is designed to treat 18 million gallons per day (mgd) at a dose of 42 millijoules per square centimeter (mJ/cm<sup>2</sup>)
- At 18 mgd, the head loss through one reactor is 10 inches.

### Lamps



- Each reactor has eight medium-pressure, high-output lamps
- Lamp intensity and quantity

of lamps in operation is automatically adjusted based on ultraviolet transmittance (UVT), flow, and intensity

### Sleeves

- Each lamp is housed in a high-purity fully-annealed quartz sleeve

### Sensors

- Each reactor has eight sensors housed in quartz sleeves to measure UV lamp intensity
- The sensors are periodically compared to a standard reference sensor

### Cleaning System

- Each reactor has an automatic cleaning system which wipes the exterior of all quartz sleeves in the reactor



**Ultraviolet disinfection performs best** in waters that contain few UV-absorbing compounds, have low turbidity, and have target organisms that are susceptible to UV disinfection. The water from NSWC meets all of these criteria.

## NORTH SHORE WATER COMMISSION

### Communities Served



And

**Wholesale Customer**  
**WE Energies Water Services**



NSWC Water Filtration Plant:  
400 W. Bender Road  
Glendale, Wisconsin 53217  
414-963-0160

## NORTH SHORE WATER COMMISSION



# Ultraviolet Disinfection



## The North Shore Water Commission (NSWC)

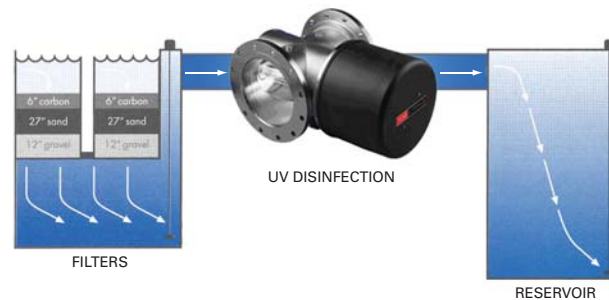
recognized the public health risk posed by pathogens and disinfection by-products (DBPs) in drinking water as a critical issue. To prepare for compliance with the LT2 Rule and Stage 2 DBP Rule, the NSWC installed ultraviolet (UV) light disinfection to provide an additional barrier to pathogens. Together with well-qualified operations and maintenance staff, this technology ensures the production of the highest quality water.

Implementing UV disinfection at the Water Filtration Plant provides the following benefits to NSWC customers:

- Reduced pathogen risk from Cryptosporidium, Giardia, and other pathogens
- Provision of a second treatment barrier to chlorine resistant pathogens
- Reduced formation of DBPs through lower chlorine dosage, thus reducing carcinogen risk
- Improved public health protection and public relations



**The use of conventional treatment, chlorine disinfection, and UV disinfection are all part of the Water Filtration Plant multiple barrier treatment philosophy.** In this approach, different types of disinfection are used at different points in the treatment process to ensure the elimination of microorganisms found in Lake Michigan water. UV disinfection follows filtration and precedes chlorination.



UV disinfection involves pumping filtered water through a reactor containing eight UV light emitting lamps. The UV light inactivates bacteria, pathogens, and viruses found in the filtered water.

Following UV disinfection, chlorine is added upstream of the finished water reservoir to provide virus inactivation. Finished water is then pumped from the reservoir to the NSWC member communities and wholesale customer.

**Design of UV System—** The design includes two UV disinfection process trains each with a 24-inch diameter UV reactor each with a capacity of 18 million gallons per day (mgd). Because the UV process follows filtration, the water allows greater than 97% percent UV light transmittance. Each UV disinfection reactor was designed to remove more than 99.9% percent (3-log) of Cryptosporidium and Giardia at a maximum flow rate and with the lamps set at 80% percent of lamp power. In addition, any water not receiving the target UV dose is pumped back to the filter clearwell, eliminating the need for an uninterruptible power supply.

