

UV protection



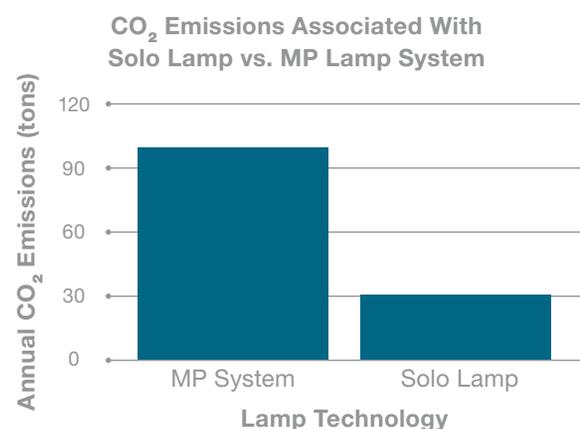
By Adam Festger

Metro Vancouver protects residents with UV drinking water disinfection

Figure 1. UV Disinfection System Featuring Amalgam Lamp Technology



Figure 2. CO₂ Estimates Based on Predicted Electricity Consumption at Coquitlam WTP



Metro Vancouver, located in the lower mainland of British Columbia, Canada, is home to almost 2.3 million people, making it the country's third largest city. It draws water from three sources: the Seymour, Capilano and Coquitlam reservoirs.

The Greater Vancouver Water District (GVWD) owns and operates the Coquitlam Water Treatment Plant (WTP), which has a rated treatment capacity of 1,200 million liters (317 million gal) of drinking water per day. The watershed for the Coquitlam Reservoir is protected, so filtration is not required at the Coquitlam WTP. In 2005, however, in response to changes to the Canadian Drinking Water Quality Guidelines, the GVWD board approved a proposal to upgrade the Coquitlam WTP with ultraviolet (UV) disinfection technology as the primary means of disinfection.

Engineers evaluated the existing treatment train of ozone/chlorine for disinfection and soda ash for corrosion control. After review, it was decided that UV disinfection was needed to provide sufficient multibarrier protection to ensure that Metro Vancouver residents receive the safest and highest-quality water possible.

Metro Vancouver had specific requirements for this project, including:

- An energy-efficient solution with the smallest environmental footprint;
- Reduced carbon emissions;
- An easy-maintenance system with low lamp count and an effective quartz sleeve-cleaning system; and
- Flexibility to install the equipment in a vertical piping network.

Equipment Overview

In the spring of 2010, Trojan was selected as the supplier of UV disinfection equipment for the Coquitlam WTP upgrade. The installation included eight TrojanUVTorrent reactors equipped with TrojanUV Solo Lamp technology (see Figure 1). The system is sized to deliver a required UV dose of 12 mJ/sq cm to 1,200 million liters of water per day, sufficient to perform a minimum 3-log reduction of *Cryptosporidium* and *Giardia*.

"Metro Vancouver is committed to providing clean, safe drinking water in a sustainable way," said Inder Singh, senior engineer for Metro Vancouver's Engineering and Construction Department. "Upgrading the Coquitlam water treatment system is a key component of this mandate. The project goals include using an energy-efficient UV technology that is easy to maintain, flexible to install and minimizes our impact on the environment. The TrojanUVTorrent system was selected to help us meet our objectives."

At 1,000 watts per lamp, the Solo Lamp is a powerful amalgam lamp. By utilizing this technology, the TrojanUVTorrent provides Metro Vancouver with a best-of-both-worlds UV solution: one that combines the ease of maintenance and compact footprint associated with a medium-pressure (MP) lamp system with the electrical efficiency of a low-pressure, high-output (LPHO) lamp system. The reactor was designed to increase efficiency and operational flexibility to save power, making it an ideal solution for the vertical pipe loop, gravity-fed system at the Coquitlam WTP.

The amalgam lamp technology combines the best features of both medium- and low-pressure lamp technology. Like MP lamp systems, it offers low lamp count and a small footprint and is dimmable from 100% to 30% power. Like LPHO lamp systems, it offers low power consumption (one-third the energy usage of MP lamps), long lamp life (more than 12,000 hours), and a low carbon footprint and environmental impact.

Environmental Sustainability

Metro Vancouver formally placed the concept of sustainability at the center of its operating and planning philosophy, calling it the Sustainable Region Initiative (SRI). Numerous sustainable features were incorporated into the new UV building, including a green roof, EcoSmart concrete (made using low-carbon-dioxide-emitting methods) and a hydronic heating system that uses water to heat or cool the building.

In accordance with the SRI, Metro Vancouver utilized key sustainability metrics to select its UV system supplier. Electrical energy consumption and physical footprint were heavily weighted evaluation parameters, and Trojan exceeded on both. The UV disinfection equipment requires 70% less electricity than an alternative MP lamp-based system, and the Solo Lamp's high UVC output results in fewer lamps and a small physical footprint.

Furthermore, the company provided a carbon footprint analysis comparing MP and Solo Lamp-based UV systems. Under typical operating parameters at the Coquitlam WTP, the TrojanUVTorrent produces one-third the carbon emissions of a comparable MP solution (see Figure 2). Over a 20-year period, this will result in 1,380 fewer tons of carbon dioxide being released into the atmosphere. ^{www}

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