

TROJAN UV™

CASE STUDIES

Municipal Drinking Water

Disinfecting with UV in Drinking Water



UV Disinfection – Coquitlam Water Treatment Plant, METRO VANCOUVER, British Columbia

PROJECT BACKGROUND

Metro Vancouver, located in the lower mainland of British Columbia is home to nearly 2.3 million people, making it the third largest city in Canada.

Metro Vancouver draws water from three different sources: the Seymour, Capilano, and Coquitlam Reservoirs. The Greater Vancouver Water District owns and operates the Coquitlam Water Treatment Plant (WTP), which has a rated treatment capacity of 1,200 million litres (317 million gallons) of drinking water per day. The watershed for the Coquitlam Reservoir is protected and therefore, filtration is not required at the Coquitlam WTP. However, in 2005, in response to changes to the Canadian Drinking Water Quality guidelines, the Greater Vancouver Water District Board approved a proposal to upgrade the Coquitlam WTP with UV disinfection technology to act 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 multi-barrier protection to ensure the residents of Metro Vancouver were receiving 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
- Flexibility to install the equipment in a vertical piping network

THE TROJAN SOLUTION

In the spring of 2010, Trojan was selected as the supplier of UV disinfection equipment to the Coquitlam WTP upgrade. The installation includes a total of eight TrojanUVTorrent™ reactors, equipped with TrojanUV Solo Lamp™ Technology (Figure 1). The system is sized to deliver a required UV dose of 12 mJ/cm² to 1,200 million liters of water per day, sufficient to perform a minimum 3-log reduction of *Cryptosporidium* and *Giardia*.

At 1,000 Watts per lamp, the Solo Lamp is the most powerful amalgam lamp in the industry. By utilizing Solo Lamp 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 lamp system with the electrical efficiency of a low pressure high output (LPHO) lamp system. The reactor was designed to

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increase efficiency and operational flexibility to save power, making it the ideal solution for the vertical pipe loop, gravity-fed system at the Coquitlam WTP.

TrojanUV Solo Lamp Technology combines the best features of both medium and low-pressure lamp technology.



BENEFITS OF MP LAMPS

- Low lamp count and small footprint
- Dimmable from 100 to 30% power

BENEFITS OF LPHO LAMPS

- Low power consumption (1/3 the energy usage of MP lamps)
- Long lamp life (>15,000 hours)
- 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 which is made using low

carbon dioxide emitting methods and a hydronic heating system which uses water to heat or cool the building.

In accordance with the SRI, Metro Vancouver utilized key sustainability metrics to select Trojan as the UV system supplier. Electrical energy consumption and physical footprint were heavily-weighted evaluation parameters and Trojan exceeded on both. The TrojanUVTorrent, using Solo Lamp Technology requires 70% less electricity than an alternative medium pressure lamp-based system and the Solo Lamp's high UVC output results in fewer lamps and a small physical footprint. Further, Trojan provided a carbon footprint analysis, comparing medium pressure (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 CO₂ being released into the atmosphere.

FULL SCALE SYSTEM

SYSTEM DESIGN PARAMETERS

- **PEAK FLOW CAPACITY:** 1,200 MLD (317 MGD)
- **DISINFECTION REQUIREMENT:** Required dose of 12 mJ/cm²
- **TARGET REDUCTION OF CRYPTOSPORIDIUM:** 3-log
- **TARGET REDUCTION OF GIARDIA:** 3-log
- **NUMBER OF UV UNITS:** 8 Units (7 duty, 1 standby)
- **DESIGN UV TRANSMITTANCE:** 84.5%



Figure 1. TrojanUVTorrent utilizing Solo Lamp Technology.

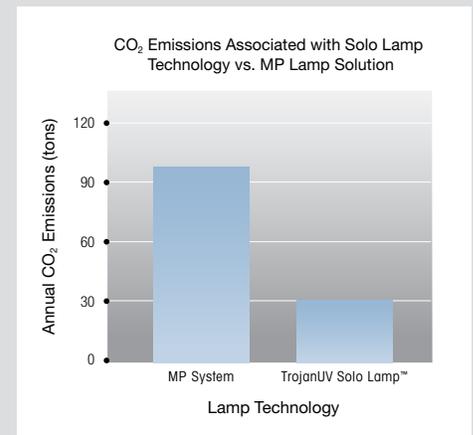


Figure 2. CO₂ estimates are based on predicted electricity consumption at the Coquitlam WTP.

TROJAN TESTIMONIAL

"Metro Vancouver is committed to providing clean, safe drinking water, in a sustainable way. Upgrading the Coquitlam water treatment system is a key component of this mandate. The project goals include using an energy efficient UV technology which 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."

Inder Singh
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