

TROJAN UV[™]

CASE STUDIES

Environmental Contaminant Treatment



Treating Micropollutants and Disinfecting With UV in Drinking Water

PWN Water Supply Company, NORTH-HOLLAND, the Netherlands

PWN Water Supply Company, North Holland is currently operating a TrojanUVSwift[™]ECT UV-oxidation system to provide an additional treatment barrier to micropollutants at their plant in Andijk, the Netherlands. In addition, the UV system disinfects, inactivating pathogenic microorganisms such as the spores of sulfite-reducing clostridia (SSRC), *Cryptosporidium* and *Giardia*. The drinking water treatment plant serves approximately half a million people and can treat up to 4,000 cubic meters per hour (or approximately 25 million gallons per day).

PWN is leading the way in the application of our UV-oxidation technology to meet the strict European Union standards limiting the concentration of pesticides in drinking water. Under the European Union's Water Framework Directive, the concentration of each individual pesticide may not exceed 0.1 parts per billion

(ppb). Additionally, the total concentration of pesticides in drinking water may not exceed 0.5 ppb. In contrast to other treatment technologies that can be used to treat such micropollutants, UV-oxidation is simple to operate and does not produce harmful by-products such as bromate.

UV-oxidation has emerged as a cost-effective solution for treating micropollutants and microorganisms in water. Like many water supplies throughout the world, IJssel Lake, the lake from which PWN extracts its water, can be impacted by industrial and agricultural activity. The threat of contamination from pesticides, herbicides, and other micropollutants such as endocrine disruptors and pharmaceuticals is a year-round concern. Trojan's UV-oxidation system proactively ensures that the plant meets all future drinking water standards.

SYSTEM DESIGN PARAMETERS

- **AVERAGE FLOW RATE:**
3,000 m³/hr (19 MGD)
- **PEAK FLOW RATE:**
4,000 m³/hr (25 MGD)
- **APPROXIMATE NUMBER OF CUSTOMERS SERVED:**
500,000
- **DISINFECTION METHOD:** UV
- **ULTRAVIOLET TRANSMITTANCE (UVT):** 80%
- **OXIDIZER (FOR MICROPOLLUTANT DESTRUCTION):** Hydroxyl radicals from UV/peroxide
- **MICROPOLLUTANT TREATMENT GOAL:** 80% reduction in influent concentration

CASE STUDIES

THE TROJANUV SOLUTION

The plant at Andijk utilizes UV in conjunction with hydrogen peroxide to produce hydroxyl radicals. The hydroxyl radical is one of the most powerful oxidizing species known, and reacts quickly with organic constituents in the water. PWN is one of the first drinking water facilities to utilize UV as a contaminant treatment technology as well as a safe, chemical free disinfection tool.

The simultaneous treatment of micropollutants and microorganisms are performed using the TrojanUVSwiftECT, TrojanUV's medium-pressure lamp-based UV-oxidation system. Over the past several years, in a joint research effort, TrojanUV and PWN have optimized the treatment of micropollutants with UV light and hydrogen peroxide to minimize capital and ongoing operation and maintenance (O&M) costs.

PROVEN PERFORMANCE

Following installation of the TrojanUV system, a series of performance tests were performed using the TrojanUVSwiftECT at PWN. While micropollutants levels in IJssel Lake were relatively low (below European Union regulatory standards), finished water from the plant was redirected to waste while a number of pesticides and test microorganisms were introduced upstream of the chambers. The objectives of the testing were to validate the performance of the UV-oxidation system and ensure that predicted sizing was correct.



TrojanUV sized the full scale system using sophisticated computer modeling and data collected from the research collaboration between PWN and TrojanUV. Target micropollutant destruction was 80% of influent concentrations. As can be seen in **Figure 1**, this target was successfully achieved. The testing confirmed that full scale system sizing was accurate and normal drinking water supply operation continues currently.

TESTIMONIAL

"With TrojanUV's optimized UV technology, we are cost-efficiently treating the water for micropollutants and disinfecting without forming harmful byproducts."

Joop Kruithof, Ph.D. Chief Scientist,
PWN Water Supply Company North-Holland

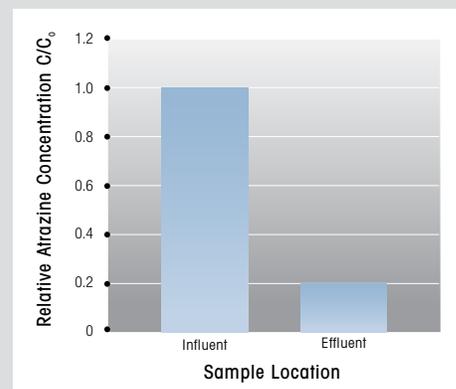


Figure 1. Results of performance testing at PWN: Atrazine concentration reduction.



Using a combination of UV light and hydrogen peroxide, the TrojanUVSwiftECT system provides superior disinfection without producing harmful by-products such as bromate.

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