

# TROJAN<sup>UV</sup> CASE STUDIES

Municipal Drinking Water



## Trojan UV Solutions: USEPA Long Term 2 Enhanced Surface Water Treatment Rule Compliance

### LT2 Compliance – White Tanks RWTF, SURPRISE, Arizona

#### PROJECT BACKGROUND

The White Tanks Regional Water Treatment Facility (White Tanks) is located in Surprise, Arizona, and treats surface water from the Colorado River that is delivered by a 336 mile (540 kilometer) man-made canal. Using surface water for a new water supply required that White Tanks comply with the United States Environmental Protection Agency's (USEPA) Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule).

The LT2 Rule was introduced in 2006 to address the risk of current water treatment practices not fully protecting the public from harmful protozoa including *Cryptosporidium*. This protozoan parasite can be present in surface water that is used as a drinking water source and can cause severe illness when ingested. *Cryptosporidium's* small size (4-5 microns) can allow it to pass through filters and it is highly resistant to standard disinfectants like chlorine and chloramines.

The LT2 Rule is in place to protect against *Cryptosporidium* (and other disease-causing microorganisms such as *Giardia*). It requires high-risk and unfiltered drinking water treatment plants to install an additional treatment step providing a multi-barrier strategy.

Drinking water facilities can evaluate various USEPA-recommended technologies for meeting the LT2 Rule such as ultraviolet disinfection (UV), membrane filtration and ozone.

#### THE TROJAN SOLUTION

After an evaluation of available technologies and suppliers, White Tanks chose TrojanUV disinfection to meet the LT2 Rule and to satisfy their site-specific needs. Two TrojanUVSwift™ units were installed in August of 2009.

UV is highly effective against *Cryptosporidium* and *Giardia*, easily inactivating them at low doses, making it a cost-effective solution. The

USEPA Office of Water cost report determined that UV is less than 1/5<sup>th</sup> the cost of ozone disinfection and 1/10<sup>th</sup> the cost of membrane filtration (Figure 1).

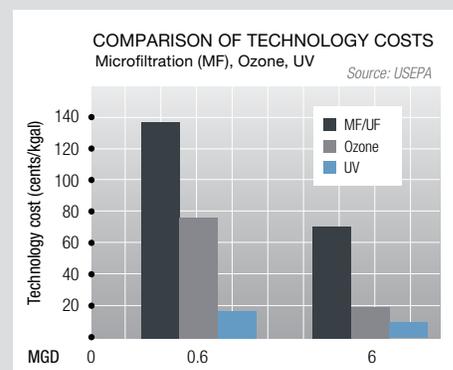


Figure 1. The USEPA's Office of Water cost report demonstrates, for both small and large plants, that UV is the most cost-effective technology when compared to ozone disinfection and membrane filtration.

# CASE STUDIES

UV systems used to comply with the LT2 Rule must undergo independent third party validation testing. The TrojanUVSwift went through full-scale testing to inactivate a test microorganism called MS2-phage. This non-pathogenic challenge microorganism was used to simulate the reactor's performance in treating *Cryptosporidium* and demonstrate that the TrojanUVSwift could meet White Tank's disinfection requirement.

"Our site-specific criteria for a solution was a small installation footprint and technology that was environmentally friendly", says Joseph Cornejo, operator of the facility.

A UV system has a small footprint because of the short contact time needed to inactivate microorganisms. Microorganisms are inactivated virtually instantaneously within the reactor, compared to a requirement of several minutes for chemical disinfectants. The footprint and resulting construction costs of UV systems are much smaller than chlorine and its required contact tanks.

UV disinfection is a physical process that adds nothing to the water but light. Disinfection byproducts (DBPs) are not created, making it an environmentally friendly technology. As such, UV also becomes an ideal option for those facilities complying with USEPA's Stage 2 Disinfectants and Disinfection Byproducts Rule (DBP Rule) promulgated simultaneously with the LT2 Rule. The DBP Rule's purpose is to reduce the potential health risks of DBPs. Chemical disinfectants, such as chlorine, react with naturally-occurring materials in water to form these byproducts, which may pose health risks to both humans and aquatic life.

## SYSTEM PERFORMANCE

The TrojanUVSwift units have been working effectively and efficiently since their installation. Daily *Cryptosporidium* monitoring has revealed zero violations.

White Tanks operator, Joseph Cornejo, likes the equipment's ease of operation, system automation and its accessibility for repair and calibration. He notes that, "The SCADA communication system is set to send an alarm to the control center automatically in the event that the combination of plant flow, UVT (UV Transmittance), and reactor power (level) results in operation outside the validation limits for the equipment (also referred to as off-spec water)."

Joseph also explains that the "facility output is currently 13-14 MGD with each of the two units capable of treating 20 MGD. This allows for facility volume expansion while still being able to achieve 3-log inactivation of *Cryptosporidium* and *Giardia*". The TrojanUVSwift units will be working for White Tanks long into the future.

## CUSTOMER TESTIMONIAL

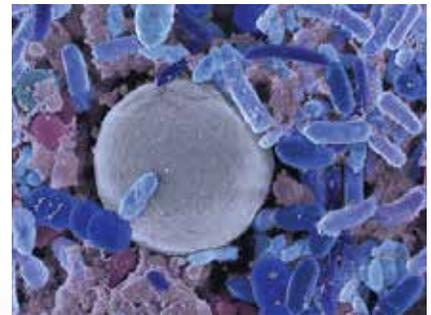
*"I only have good things to say about my experience with TrojanUV. They have made complying with the LT2 Rule really easy. Our TrojanUVSwift systems continually achieve the required 3-log inactivation of Cryptosporidium and Giardia, which means our community is fully protected."*

**Joseph Cornejo**  
Operations Supervisor  
White Tanks Regional Water Treatment Facility

## SYSTEM DESIGN PARAMETERS

- AVERAGE FLOW CAPACITY: 13-14 MGD
- PEAK FLOW CAPACITY: 40 MGD
- DISINFECTION REQUIREMENT: 3-log inactivation of *Cryptosporidium* and *Giardia*
- UV TRANSMITTANCE: 93%

## WHAT YOU SHOULD KNOW ABOUT CRYPTO



*Cryptosporidiosis*, the illness caused by *Cryptosporidium* can be severe or even fatal for infants, the elderly and other people with weakened immune systems. This gastrointestinal illness causes diarrhea, dehydration, stomach cramps, and/or fever symptoms that typically last from several days to two weeks.

*Cryptosporidium* has caused a number of waterborne disease outbreaks in the United States. One of the most damaging was in 1993 in Milwaukee, WI where 400,000 people became ill and 100 people died. *Cryptosporidium* contamination can come from agriculture, wastewater treatment plant discharges, wild life, and other sources of fecal matter.

### References:

Technologies and Costs Document for the Final Long Term 2 Enhanced Surface Water Treatment Rule and Final Stage 2 Disinfectants and Disinfection Byproducts Rule. USEPA Office of Water, December 2005.

North America T. 519.457.3400 F. 519.457.3030 www.trojanuv.com  
Europe (please contact our UK office) T. +44 (1905) 771117 F. +44 (1905) 772270

**TROJAN UV**  
WATER CONFIDENCE™

The products described in this publication may be protected by one or more patents in The United States of America, Canada and/or other countries. For a list of patents owned by Trojan Technologies, go to [www.trojanuv.com](http://www.trojanuv.com).

©Copyright 2013. Trojan Technologies, London, Ontario, Canada.  
No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the written permission of Trojan Technologies. DW-0213