TROJAN UV

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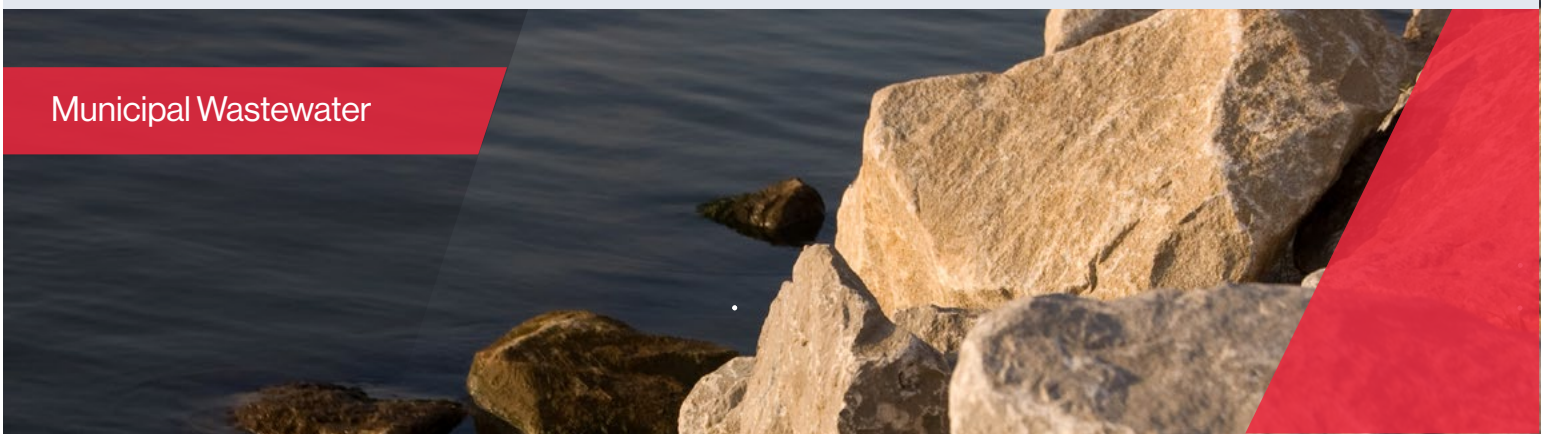
CASE STUDIES

Municipal Wastewater



Plant Name: Murfreesboro Water Resource Recovery Facility
Location: Murfreesboro, Tennessee
System: TrojanUVSigna™

Out With the Old, in With the New – Murfreesboro Water Resource Recovery Facility Replaces its Aging UV System

PROJECT BACKGROUND

The City of Murfreesboro is located approximately 30 miles from Nashville. It is home to Middle Tennessee State University – the largest undergraduate university in the state – and to an ever-growing population. In fact, in 2017 Murfreesboro was listed among the top 15 fastest-growing cities in the U.S.

Population growth had led to many infrastructure upgrades, including at the Murfreesboro Water Resource Recovery Facility. The treatment plant – owned and operated by the Murfreesboro Water Resources Department (MWRD) – is the only one serving the city.

Staff at the treatment plant employ the U.S. water and wastewater industry's Effective Utility Management (EUM) system as a guide. Not only is the EUM a starting point for any utility's path to effective and sustainable operations, it also helps treatment plant professionals take a 360-degree look at its utility and set key priorities.
In 1999, the MWRD decided to convert from chlorine to UV treatment. They – just like many hundreds of other wastewater treatment plants at the time – wanted an effective treatment solution, and ultimately found one in the TrojanUV4000™.

UV treatment is a physical process that inactivates specific microorganisms as they pass by UV lamps submerged in the effluent. The process, has no impact on the chemical composition or the dissolved oxygen content of the water. The inherent benefits are also among the reasons why a growing number of wastewater treatment plants in North America now utilize UV treatment systems.

The TrojanUV4000 provided steadfast performance for nearly two decades. It wasn't until 2013, driven by the need for increased capacity, that Plant Manager John Strickland started looking at his treatment upgrade options.

"17 years of 100% effectiveness from our previous TrojanUV system made us confident that upgrading with TrojanUV would continue this excellent performance," says Strickland.

THE TROJANUV SOLUTION

Significant innovation had occurred in the 17 years since the TrojanUV4000 was installed at the Murfreesboro Water Resource Recovery Facility. Advancements associated with system efficacy, simplified maintenance, and energy efficiency had been introduced, all of which correlate to cost savings. Such advancements can all be found in the TrojanUVSigna – the UV system that was selected for the upgrade.

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"Product quality was the primary attribute," says Strickland. "Our [water] is regulated by the United States Environmental Protection Agency and the Tennessee Department of Environment & Conservation, and our intention is to ensure full compliance at all times and never violate the permit that they have given to the City of Murfreesboro."

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Another important EUM attribute is financial viability, so an integral factor in the UV system selection process was a total life cycle cost assessment.

UTILIZING EXISTING CHANNELS

The TrojanUVSigna was designed to fit into existing channels and chlorine contact chambers, all without major modifications to the channel depth or width; this was yet another benefit for the Murfreesboro Water Resource Recovery Facility.

Contractors were able to remove the TrojanUV4000 (sized to treat 40 MGD) from the channels, and install the TrojanUVSigna (sized to treat 60 MGD) in its place – reducing both the on-site civil works and total upgrade costs.

"The upgrade satisfied our need for increased capacity," says Strickland. "Additionally, the system is extremely energy efficient."

TrojanUVSigna incorporates innovations, including TrojanUV Solo Lamp™ Technology, to reduce the total cost of ownership and drastically simplify operation and maintenance.

MAINTENANCE BENEFITS

The TrojanUVSigna was designed to make the operator's job easier. Lamp change-outs and cleaning solution replacements are done while the UV banks are in the channel. And, thanks to the modular Power Distribution Center (PDC), components for one bank are isolated and can be accessed while other banks remain energized and working.

SOLO LAMP TECHNOLOGY

SYSTEM DESIGN PARAMETERS

PEAK DESIGN FLOW:
60 MGD (227,124 m^3/d)

CHANNELS, BANKS & LAMPS:
Two Channels, Two Banks Per Channel, 33 Lamps Per Bank

DESIGN UVT: 65%

TREATMENT LIMIT:
126 E.coli/100ml, 487 E.coli/100ml (maximum)

TrojanUVSigna Maintenance Benefits	
LAMPS	
Fewer needed to treat the same flow	✓
Change-outs can be done without raising banks from the channel	✓
LEDs visually indicate on/off status locally	✓
LAMP DRIVERS (BALLASTS)	
1 per 2 lamps	✓
Housed in panels & use plug-in connectors for simple removal	✓
Panels provided with optional air conditioning – no pumps/glycol loop for cooling	✓
SLEEVE CLEANING	
Solution replenished without removing bank from the channel	✓
Solution shared between a minimum of 6 lamps	✓
Visual indicator shows when wipers are in parked position	✓
BANKS AND BANK REMOVAL	
Integral bank walls raise for simple cleaning – no need to enter channel	✓
Modular banks enable smaller overall footprint	✓
Entire bank is raised using the Automatic Raising Mechanism (ARM)	✓

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