TROJANUV™

CASE **STUDIES**

Advanced Oxidation Processes

Location: Nassau County, Long Island, New York
System: TrojanUV advanced oxidation systems

Successful Piloting of UV Advanced Oxidation on Long Island for 1,4-dioxane Treatment

PROJECT BACKGROUND

1,4-Dioxane is a stabilizing compound classified as a "likely human carcinogen" by the United States Environmental Protection Agency (USEPA). Once it enters the environment, it can migrate easily into groundwater supplies.

On Long Island, in New York State, 1,4-dioxane has been a detected contaminant of concern in groundwater for many years. Testing mandated by the USEPA Third Unregulated Contaminant Monitoring Rule (UCMR 3) showed that over half of the tested wells on Long Island had detectable levels of 1,4-dioxane[1].

The New York State Department of Health (NYDOH) aggressively limits 1,4-dioxane and is proposing an enforceable maximum concentration of 1 part per billion in the drinking water supply[2]. It is estimated that over 70 wells supplying public drinking water across Long Island have detected 1,4-dioxane contamination above or very close to this limit.

PILOTING ADVANCED OXIDATION

The NYDOH has accepted the ultraviolet advanced oxidation process (UV AOP) as a treatment solution for 1,4-dioxane[3]. UV AOP is a powerful treatment process capable of removing persistent environmental contaminants, including but not limited to 1,4-dioxane which are less effectively treated by other advanced treatment methods such as activated carbon, reverse osmosis, or air stripping.

For water providers located in Nassau County on Long Island, it was necessary to pilot UV AOP technology at the various wells requiring treatment in order to confirm treatment efficacy and obtain state approval. This meant piloting UV AOP technology at dozens of wells affected by 1,4-dioxane located across 452 square miles.

THE TROJANUV SOLUTION

Urgency for meeting the pending limits for 1,4-dioxane necessitated rapid deployment of piloting equipment across the service area in order to obtain rapid approval for the future full-scale 1,4-dioxane treatment systems needed in Nassau County.

To ensure fast and effective piloting, Trojan developed several compact UV AOP pilot stations. These stations were easily mobilized on trucks for simple transport between well sites.

LONG ISLAND UV AOP MOBILE PILOT STATION CONFIGURATION

- Low-pressure UV disinfection system using TrojanUV Solo Lamp™ Technology (power panel included)
- Oxidant dosing equipment, including mixers and injectors
- Online UV transmittance (UVT) monitor
- Online controller to drive optimal UV AOP performance
- Sample collection station with four catchments
- Storage for spare UV lamps and other components

CASE **STUDIES**

At each well site, the pilot station was quickly connected to water and chemical oxidant supplies. This efficient transportability enabled the facilitation of over 24 separate pilots in six months and ensured that contaminated well sites in Nassau County could rapidly meet their groundwater remediation commitments.

UV AOP pilot stations were easily transported between well sites, enabling the facilitation of over 24 separate pilots in six months.

PILOTING EXPERTISE

Confirming the effectiveness of UV AOP at contamination sites is important because site-specific characteristics of the water strongly influence performance. This can require bench-scale and pilot-scale testing.

Trojan's team of scientists, researchers, and technicians have analyzed thousands of water samples from around the world and are often called upon to confirm UV AOP treatability through the rapid deployment of mobile pilot stations.

Testing entails measuring characteristics of water critical to UV AOP performance, including UV transmittance, pH, nitrate ion concentration, and radical scavenging.

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From this, it can be determined if UV AOP is the optimal solution and, if it is, will enable the design of a robust UV advanced oxidation system engineered specifically for the unique treatment needs of the application.

TrojanUV advanced oxidation systems have been installed at treatment plants from California to Australia to treat a wide variety of contaminants, including 1,4-dioxane, pesticides, nitrosamines, taste-and-odor-causing compounds, and algal toxins.

ENVIRONMENTAL CONTAMINANTS REMOVED BY UV AOP

VOLATILE ORGANIC COMPOUNDS
- 1,4-Dioxane
- Trichloroethylene (TCE)
- Tetrachloroethylene (PCE)

DISINFECTION BY-PRODUCTS
- N-nitrosodimethylamine (NDMA)

TASTE AND ODOR CAUSING COMPOUNDS
- 2-Methylisoborneol (MIB)
- Geosmin

PESTICIDES
- Metaldehyde
- Atrazine

ALGAL TOXINS
- Anatoxin
- Microcystin

EXPLOSIVES
- Hexahydro-1,3,5-trinitro1,3,5-triazine (RDX)

HAZARDOUS SUBSTANCES
- Cyanide

REFERENCES

1. "The Third Unregulated Contaminant Monitoring Rule (UCMR 3): Data Summary, January 2017", United States Environmental Protection Agency, https://www.epa.gov/sites/production/files/2017-02/documents/ucmr3-data-summary-january-2017.pdf

2. "Drinking Water Quality Council Recommends Nation's Most Protective Maximum Contaminant Levels for Three Unregulated Contaminants in Drinking Water", Department of Health, New York State, https://www.health.ny.gov/press/releases/2018/2018-12-18_drinking_water_quality_ council_ recommendations.htm

3. "SCWA 1,4-Dioxane Treatment System Approved by New York State", Suffolk County Water Authority, https://www.scwa.com/14-dioxane_treatment_system_approved/

About TrojanUV

TrojanUV designs and manufactures pressurized and open-channel UV disinfection systems for municipal wastewater and drinking water, as well as UV-oxidation systems for environmental contaminant treatment and potable and non-potable reuse applications. We have the largest municipal UV installation base in the world and are proud to play an important role in continually advancing UV disinfection technology. TrojanUV is part of the Trojan Technologies group of businesses.

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TROJAN UV™ Water Confidence™