

# TROJAN UV™

## CASE STUDIES

### Environmental Contaminant Treatment



Water Reuse Example:  
NDMA Treatment and  
Disinfection with UV

## Recycled Water Project, WATER REPLENISHMENT DISTRICT, Leo J. Vander Lans Water Treatment Facility

Groundwater pumping in the Los Alamitos, California area near Long Beach (pictured above) over the last century has caused groundwater levels to drop, allowing seawater to intrude into the local groundwater aquifer. To prevent additional infiltration by seawater, a coastline barrier of wells injecting fresh water has been in place since 1965. Until recently, imported potable drinking water was injected into the aquifer. However, the Alamitos Barrier now utilizes highly-treated recycled water for this application. One obstacle to the use of recycled water, however, is that it contains the contaminant *N*-nitrosodimethylamine (NDMA). Because the injected water mixes with potential drinking water in the aquifer, it must be of drinking water quality. The California Department of Public Health (CDPH), in February 2002, set a 10 part per trillion (ppt) drinking water notification level for NDMA. Due to its low affinity for carbon and its low volatility, NDMA resists removal by traditional treatment technologies such as carbon adsorption and air

stripping. In addition, due to its small molecular weight, NDMA passes through reverse osmosis (RO) membranes. However, NDMA degrades rapidly when exposed to ultraviolet light through the photochemical reaction known as UV-photolysis. This is cost-effectively performed using the TrojanUVPhox™. The spectral signature of the low energy, high output lamps have been uniquely selected to most efficiently treat NDMA and provide superior disinfection capabilities.

### THE TROJAN SOLUTION

To minimize footprint and energy consumption, the TrojanUVPhox™ was selected. The TrojanUVPhox™ performs the final treatment step at the Leo J. Vander Lans Water Treatment Facility in what is considered to be the “gold standard” for advanced recycled water treatment: micro-filtration, RO, and then UV with hydrogen peroxide (MF/RO/UV). MF and

RO remove particulates and larger molecular-weight dissolved constituents, while the TrojanUVPhox™ in conjunction with hydrogen peroxide, treats NDMA, disinfects, and acts as a final barrier to any other unregulated organic contaminants. The reactor treats NDMA at a fraction of the operation and maintenance costs of traditional high-energy systems, in a very compact footprint. The system is currently treating NDMA to meet California’s notification level of 10 ppt, and is performing disinfection as well.

#### DESIGN PARAMETERS

- **FLOW RATE:** 3 million gallons per day
- **INFLUENT NDMA CONCENTRATION:** 420 ppt
- **EFFLUENT NDMA CONCENTRATION:** < 10 ppt
- **DISINFECTION METHOD:** UV

# CASE STUDIES

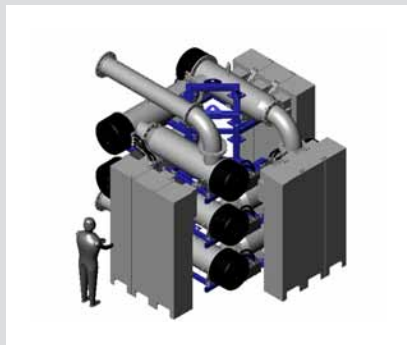
## TESTIMONIALS

*"It has been a pleasure working with Trojan Technologies. Their understanding of the science has produced a cost-effective UV solution and we look forward to working with them in the future."*

*Hoover Ng, P.E., Water Quality Program Manager, Water Replenishment District of California*

*"The Alamitos Barrier Recycled Water Project is an environmental project that will ensure a reliable and cost-effective supply of water for the Alamitos Barrier. This regional project will also increase the use of recycled water normally wasted to the ocean and protect the environment through water conservation."*

*Water Replenishment District of Southern California*



The patented TrojanUVPhox™ design for Leo J. Vander Lans Water Treatment Facility, performs disinfection as well as NDMA treatment.



The TrojanUVPhox™ installed at the Leo J. Vander Lans Water Treatment Facility.

## GENERAL CONTAMINANT OVERVIEW

**CONTAMINANT:**  
N-nitrosodimethylamine (NDMA)

- POTENTIAL SOURCES:**
- Drinking water disinfection with chlorine or chloramine
  - Printed circuit board manufacturing
  - Cosmetics manufacturing
  - Tanning of leathers
  - Pesticide manufacturing
  - Pharmaceutical manufacturing
  - Fish & seafood processing
  - Rocket fuel

- TOXICITY:**
- Probable human carcinogen

**CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH):**

- Notification level - 10 parts per trillion (ppt)

**SUMMARY:**  
NDMA is formed relatively easily in a variety of processes, including drinking water disinfection with chlorine or chloramine. This emerging contaminant, often associated with only rocket fuel contamination, is now being monitored in drinking water under the United States Environmental Protection Agency's second Unregulated Contaminant Monitoring Rule (UCMR2).

- BEFORE TREATMENT:**
- 420 ppt
- AFTER TROJAN LOW-ENERGY UV TREATMENT:**
- < 10 ppt