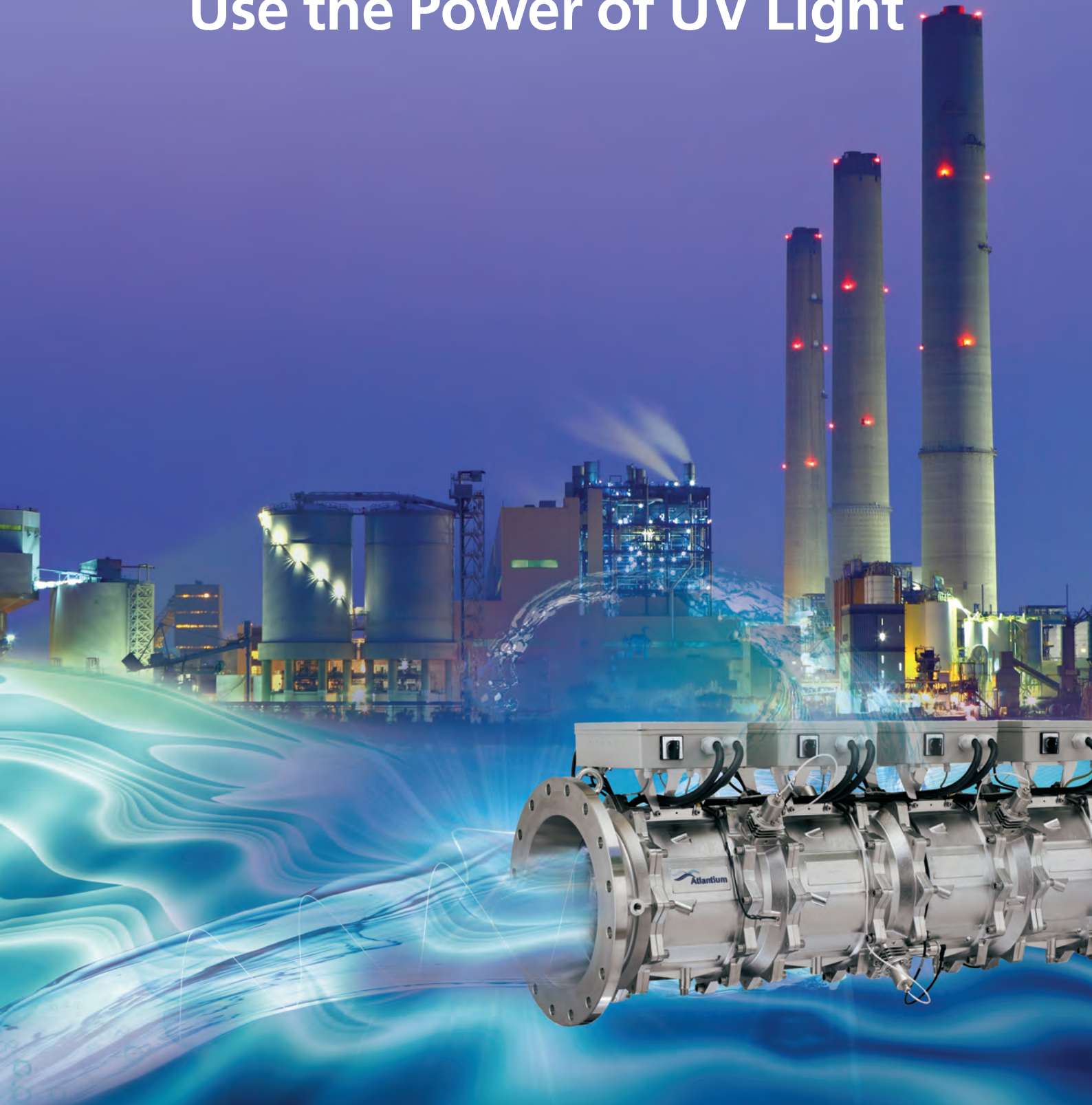




Power & Energy / Heavy Industry

Hydro-Optic™ UV Water Solutions

Use the Power of UV Light



Environmentally safe non-chemical water treatment

Non-Chemical Water Treatment

Today's environment demands proven alternatives to chemicals – solutions that don't create disinfection by-products or discharge chemicals.

Atlantium Hydro-Optic™ UV is field-proven in power plants. It provides efficient water treatment, improves performance and reduces costs. And it meets the strictest environmental regulations so you don't have to worry about disinfection by-products or discharge penalties.



Non-Chemical Disinfection & Dechlorination

Cost-effective solution for boiler feedwater/make-up water that protects RO membranes

Hydro-Optic UV treatment for non-chemical disinfection and dechlorination is a sustainable alternative to chemical (SBS/SMBS) biofouling methods and their heavy maintenance burden.

Hydro-Optic UV technology is unique in its ability to disinfect and dechlorinate boiler feedwater and make-up water in a single, non-chemical process. The system decomposes free chlorine and significantly reduces combined chlorine oxidants in process water to protect RO membranes. At the same time, the technology provides high-level disinfection that reduces membrane biofouling potential by eliminating potential for anaerobic and aerobic bacterial growth.

The combination maintains high uptime on the RO and, in turn, the integrity of the boiler feedwater.

- Reduces operational costs and maintenance burden
- Lengthens RO membrane lifespan
- Reduces organic loading leading to fewer regeneration cycles for the demineralizers
- Easily integrates into existing infrastructure; small footprint in-line system
- No chemical discharge; environmentally sustainable



Measuring free available chlorine levels using a colorimeter: no chlorine detected in water after Atlantium UV treatment

Full-scale trial at Plant Bowen Research Center

“Results from the full-scale demonstration testing of the Atlantium UV system confirm the efficacy of UV as a treatment technology option suitable for dechlorination. What's unique about the Hydro-Optic treatment approach is its ability to disinfect and dechlorinate in a single, chemical-free process.”

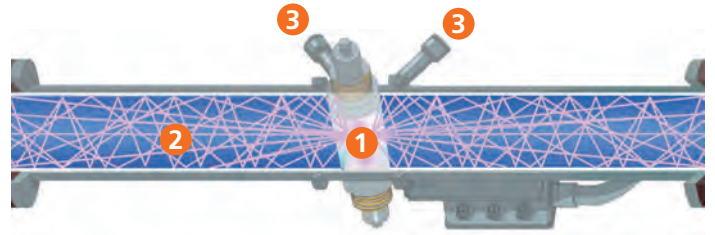
Richard Breckenridge,
EPRI Water Management Technology Program Manager



Atlantium Hydro-Optic Dechlorination installation at Plant Bowen, Georgia USA

Innovative Atlantium Hydro-Optic™ UV Technology

- Engineer validated system: certified by third-party testing based on US EPA protocols; proven in full scale trials
- Robust inline system constructed of Stainless Steel 316, with standard pipe connection, to easily integrate into existing water pipelines
- Small-footprint system requiring minimal maintenance
- Field-proven in power plants



- 1 **Proprietary Medium Pressure (MP) high intensity UV lamp is energy efficient.** Provides 2X more UV disinfecting power than other MP lamps and 16X more than low pressure lamps.
- 2 **Patented technology based on fiber-optics recycles UV photons** to optimize dose distribution and reduce energy consumption.
- 3 **Integrated control software automatically adjusts UV dose to meet real-time water quality conditions:** two sensor system insures the correct dose all the time: one sensor measures current lamp performance in real time; one sensor measures current water quality (UVT) in real time.
- 4 **Real-time data status, including the actual UV dose being delivered,** are displayed on the control screen and can also be monitored remotely.



The monitor displays real-time data, including actual dose being delivered



Mussels / Invasive Species Control

Proven macro biofouling control in industrial raw water and cooling water

While screens catch large organisms, the larvae of mussels, barnacles, clams and other invasive species settle, grow and block the pipes. The resulting reduced cooling compromises functionality and even causes power failures.

Hydro-Optic UV treatment is field-proven to prevent 99% of attachment and settlement at low UV dose rates. Atlantium's solution eliminates the need for corrosive chemicals and is safe for water and the environment.

- Sustainable, cost-effective solution
- Meets strict environmental regulations
- Non corrosive - less chemical scaling and chemical biofouling
- Cleaner surfaces for improved heat transfer

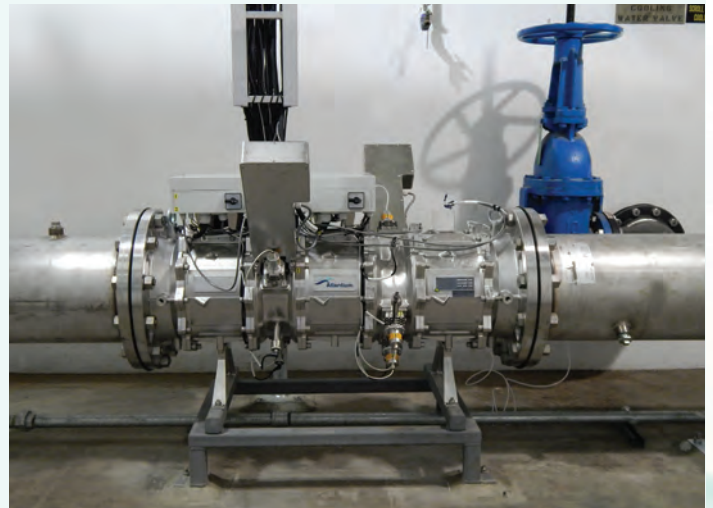


Mussel settlement in cooling water pipe before and after water treatment with Atlantium UV

Controlling Biofouling: Lower Colorado River Dams

“One Atlantium system is installed at Davis Dam and has been used for three years of research. The results have been impressive, with 99% less mussel settlement, low maintenance costs and low energy usage. Four additional Atlantium systems are scheduled for installation in 2018. At Parker Dam, five installations were completed in March 2016, and Hoover Dam installations are planned for 2016 and 2017.”

Environmental Compliance Manager at Hoover Dam for the Department of Interior's Bureau of Reclamation



Atlantium Hydro-Optic UV installation at Parker Dam, USA



Cooling Towers / Legionella

Sustainable, non-chemical solution

Traditional biocides kill many organisms, but that can open the way to robust infestations of *chemically resistant microbes*. The biofilms they form harbor and facilitate growth and protect all kinds of pathogens, algae and other organisms that threaten public health. *Legionella*, for one, thrives in cooling tower temperatures and is a significant public health hazard.

Hydro-Optic UV is a cost-effective and efficient method of reducing biofilm in cooling tower water. By preventing new biofilm formers from entering the cooling tower water, it has a profound impact on the microbial integrity downstream. It can be a key component of a *Legionella* control program because it inactivates both organisms that are resistant to chemicals and the organisms typically treated with chemicals - in a single treatment.

- Reduces the biofouling and corrosion that harbor *Legionella*
- Inactivates *Legionella* bacteria as well as other bacteria, algae and protozoa that are resistant to traditional chemical biocides
- Non-chemical solution, easy to use and maintain; meets strict environmental regulations



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About Atlantium

Atlantium Technologies Ltd., founded in 2003, is a global leader in ultraviolet (UV) treatment solutions for municipal and industrial applications. Atlantium's Hydro-Optic™ UV system is field proven and validated to the highest regulatory standards including the US EPA and FDA. It is unique in its ability to consistently monitor water quality & UV intensity and adjust the UV dose accordingly to meet application specific needs.

Facilities looking to achieve chemical-free disinfection, dechlorination, oxidation or macro/biofouling control will benefit from the use of Hydro-Optic UV technology.