



RO Protection



Power

Northern
Indiana, US

RO Protection at Plant Bailly & Plant Bowen Power Stations, US

The Challenge

Water in industry is used for a variety of reasons including process usage, cooling, steam generation, and more. The water can become contaminated as it passes through various systems, which adds bacteria, rust, and particles to the water as it loops or recirculates. To achieve desired water quality, plants apply water treatment processes that typically consists of a filtration step followed by an RO membrane.

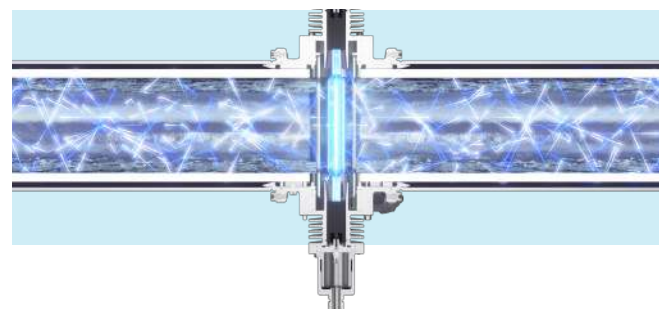
RO membranes are exposed to fouling caused by scaling (inorganic sedimentation of metal oxides, salts, and minerals); organic fouling (oil residuals, polymers); colloidal fouling (nanoparticles), and biofouling. Biofouling is a direct cause of membrane failure. In addition, biofouling causes scaling because of the low water velocity and high viscosity on the membrane surface. As a result, membranes need to be cleaned more frequently. Biofouling also causes direct oxidation of RO membranes because of the local low pH formed due to microbial activity.

Membrane-cleaning processes such as Clean In Place (CIP) can cause facilities to run at lower capacity as RO trains are taken offline for cleaning before they are returned to service. More downtime results in less water being produced. The labor-intensive cleaning processes using hazardous chemicals have been shown to shorten the membranes' lifetime.

Two US power stations, the Bailly Generating Station Northern Indiana Public Service Company (NIPSCO) and Plant Bowen Power needed solutions. NIPSCO found that the membrane elements were susceptible to microbial fouling, resulting in the need to disinfect the influent before use in the RO system. The Plant Bowen Power Station was facing frequent membrane and micron-filter maintenance and replacement resulting from biological fouling and oxidation.

The Solution

Both power stations selected Atlantium's HOD™ (Hydro-Optic Disinfection) UV to provide effective protection against RO biofouling. This is achieved by combining ultraviolet water disinfection technology with hydraulic and optic principles. The HOD UV system features the unique Total Internal Reflection (TIR) technology that recycles UV light energy, ensures homogenous UV dose distribution, provides superior power (kW) efficiency compared to traditional UV, and achieves unprecedented micro-organism inactivation.



NIPSCO installed the HOD UV technology in 2015 for the full-scale treatment of non-chemical disinfection of boiler makeup water at the Bailly Generating Station. The station uses RO technology to provide high-purity feed water for the boiler and steam cycle. The membrane elements were susceptible to microbial fouling, resulting in the need to disinfect the influent before use in the RO system. Protecting the RO membrane elements from biological fouling with HOD UV reduces the operational impact such as more frequent membrane element replacement costs, production loss, and increased energy costs associated with microbial contamination.

After installing the HOD UV system in 2014, the Plant Bowen Power Station achieved ROI in less than two years. By carrying out disinfection and dichlorination in a single, non-chemical process, HOD UV allowed Plant Bowen to reduce the use of SMBS, minimize the frequency of micron filter replacement, and significantly reduce maintenance and associated costs. After three years of operation, the RO membranes are operating at the same level as new elements.



Key benefits following the installation of HOD UV included:

75% decrease in chemical feed rate

86% reduction in monthly chemical usage

\$5K annual cost savings on chemicals

\$60–80K savings on filter replacements

>\$200K total cost savings

About us

For more than two decades, Atlantium Technologies has helped to ensure water safety with its innovative HOD™ (Hydro-Optic Disinfection) UV technology and novel approach to performance, monitoring, and control. Atlantium's superior, environmentally friendly water treatment solutions ensure stable, efficient, and dependable production.

With thousands of full-scale installations for leading brands in various industries globally, we're committed to consistently meeting our customers' water quality needs, ensuring pure results.

