

Mussel Fouling Prevention



Hydropower



Phoenix, Arizona, US

# Mussel Fouling Prevention at Mormon Flat Dam, United States

## The Challenge

The Mormon Flat Dam is a 61MW hydroelectric station managed by the Salt River Project (SRP) Office in Phoenix, Arizona. The Mormon Flat Dam has two main turbines and cooling water lines requiring protection from invasive mussels. In 2008, following the spread of quagga mussels in the Colorado River in the Colorado River, SRP began monitoring their facilities to identify control options that could protect their facilities with minimal environmental or ecological impact.

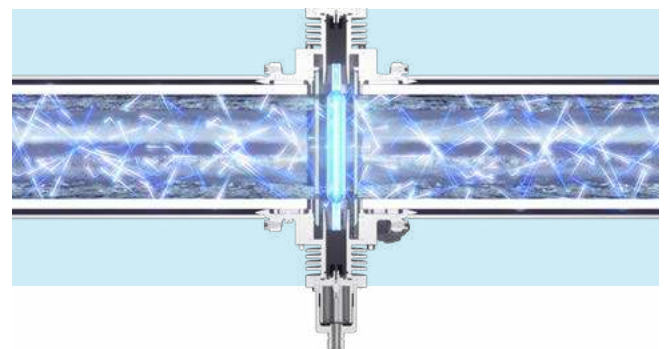
## The Solution

Following the evaluation of various chemical and non-chemical control methodologies, Atlantium's HOD™ (Hydro-Optic Disinfection) Medium Pressure (MP) UV system was selected as the preferred treatment to supplement operational and mechanical activities already in place at the Mormon Flat Dam.

In May 2018, SRP installed three HOD MP UV systems, one on the cooling water line (Model RZB Series with DPM, 204 m<sup>3</sup>/hr (900 gpm)) and two (Model RZ Series, 102 m<sup>3</sup>/hr (450 gpm) and Model RZ Series with DPM, 272 m<sup>3</sup>/hr (1,200 gpm)) on the service water lines to treat water quality conditions with percent UV transmittance as low as 85%.

HOD MP UV systems effectively control macro (invasive mussels)/micro biofouling. This is achieved by combining ultraviolet water disinfection technology with hydraulic and optic principles. The HOD UV system features 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.

The system measures three critical parameters including UVT%, flow rate, UV lamp intensity (kW), in real time to maintain the minimum required UV dose. Low Pressure (LP) UV, when used in traditional designs, are not effective in applications of macro/micro biofouling.



## Installation & Operation

The HOD UV units were installed as close to the penstock take-off as possible. The cooling water system was installed using existing 6" piping and the two service water systems were installed using existing 10" piping. The existing raw water piping was protected with a strainer for debris mussel control. The existing piping provided adequate spacing for maintenance, 30" spacing was left on either side of the unit to easily remove the bulbs, and the base mounting bracket allowed for 6-12" of space below the UV system. The inlet pipe is slightly longer than the outlet pipe to allow for laminar flow so that air bubbles are not created inside the UV chamber.

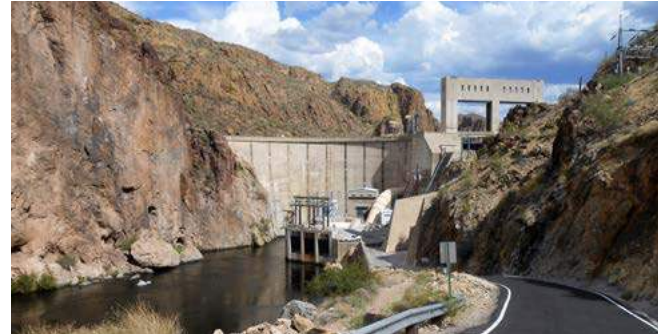
Additionally, a bypass was installed to allow the HOD UV systems to be taken out of service annually for maintenance while still ensuring adequate flow to the cooling water for the generators. All electrical components use 480V 3-phase power with one system located in a weather-proof room.

The other two HOD UV systems are installed outside, despite the manufacturer's recommendation for a protective cover from direct sunlight and rain. A flow meter was incorporated into the raw water supply to use the features of the HOD UV system to flow pace and control UV dose in real time. The flow meter also protects HOD UV from operating with no water flow to signal the UV bulbs to shut down when no flow exists, or fluid has drained out of the UV chamber. The system's communication is accomplished by MODBUS and signals are taken to a central location for monitoring the system alarms and operating parameters.

## Results

Following the full-scale installation of HOD UV technology at the Mormon Flat Dam, the facility effectively controlled macro/micro biofouling from mussels in service and cooling water lines.

The HOD UV systems minimized the risk of mussel fouling by preventing invasion and infestation at Mormon Flat Dam.



## 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.