CASE STUDY

SUISUN-SOLANO WATER AUTHORITY

PAX TRS™ THM Removal System Successfully Removes Over 42% of Trihalomethane (THM) Species in 2 Million-Gallon Water Storage Tank in Northern California

OVERVIEW

Suisun-Solano Water Authority (SSWA) is a government entity formed by the City of Suisun City and Solano Irrigation District. The purpose of two or more existing governments having "joint powers authority" is to better organize the functions and services they provide by working together.

SSWA provides water to 28,000 customers and over 8,600 services from its Cement Hill Treatment Plant. In order to meet current demand, SSWA set about to procure additional water storage in the form of a 2 million-gallon (MG) steel ground storage tank at the Cement Hill Treatment Plant. The SSWA team was aware that levels of disinfection byproducts called trihalomethane (THMs) were an issue so the bid specification for the tank they procured included a THM removal system.

The SSWA operates over 92 miles of transmission pipelines, 51 miles of service pipelines and 800 fire hydrants.

The plant can produce 10 million gallons of water daily.

THMs form in water distribution systems over time as chlorine disinfectants, used to prevent harmful biological growth, mix with naturally occurring organic material. As, water age increases, THM formation naturally progresses. (Water age refers to the time from water treatment in a plant to ultimate use.)

THMs can be removed by a process known as air-stripping as they are volatile compounds – meaning that they can be readily moved from the water (liquid phase) into air (gas phase) with the application of carefully calculated mixing energy and adequate tank-headspace ventilation.

Water utility operators closely monitor their system's running THM average against the violation level of 80 parts per- billion (ppb) set by the US EPA.

SITUATION

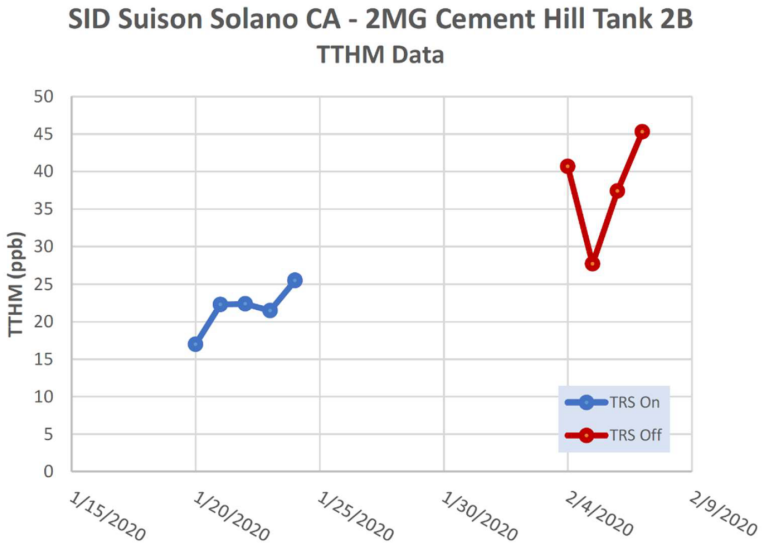
The new 2MG Cement Hill Tank was designed to flow about 5.8 million gallons per day. This high turnover limited the residence time available to remove THMs from the tank. SSWA expected that the aeration process would remove at least 20% of THM species. Since the SSWA staff had significant THM removal experience from past projects, they developed a bid specification and validation protocol to ensure process equipment would meet this challenging task.

APPROACH

The experienced SSWA team believed the PAX TRS™ THM Removal System (TRS) was ideal for their new Cement Hill Tank. The PAX TRS™ system included:

- PAX PWM-400 (1 HP) submerged mechanical tank mixers
- A 6,000 cubic-foot/minute rooftop ventilation unit for the tank
- Four 15 horsepower (HP) water surface aerators

Each of the above components are necessary to move THMs from being trapped in the tank, to the headspace in the tank to ultimately ventilated out of the tank. By utilizing Henry's Law and mass transfer principles, Neptune-Toolbox,™ our equipment selection and modeling software, enables our engineering team to present the most efficient and economical THM removal solution.



SSWA 2MG Cement Hill Tank 2B Validation Test: Achieved a 42% Reduction in THMs

RESULTS

42% REDUCTION
In THMs

SIGNIFICANTLY LESS
Volatility in THMs Over Time

- The investment in PAX TRS™ reduced overall THMs by nearly 45%.
- PAX TRS™ lead to significantly less volatility in THM counts over time, creating a much more consistent THM count.
- The operating team at SSWA gained more control over their system. Thanks to more consistent THM levels, the team had more operational flexibility and freedom.

> ***"Before we added PAX TRS™, our distribution system operational strategy was influenced by concerns about disinfection byproducts - we were tired of THM levels driving the ship. Now we have a lot of operational flexibility, and it has made life much easier."***
>
> Justin Noutary, Supervisor for Solano Irrigation District

CONCLUSION

SSWA was able to lower their overall THM count by 42%, increase consistency of THMs and gain more operational control over their system. They were and continue to be extremely pleased with the outcome.

To access our full assortment of case studies, data sheets, brochures and more, visit our document library at https://documents.cleanwater1.com or scan the QR code.

PAX PowerVent® headspace ventilation unit on Cement Hill Tank