

## **PAX TRS™ THM Removal System Successfully Removes Over 65% of Trihalomethane (THM) Species in Water Storage Tank at the End of 60-Mile Transmission Line**

In Canada and the western United States, long treated water transmission lines are frequently utilized to convey potable water to rural communities. These long transmission lines combined with chlorine for water disinfection can often create the requisite conditions for the formation of undesirable disinfection byproducts (DBPs). One of the most common DBPs is a family of volatile compounds called Trihalomethanes (THMs) which are regulated in Canada to a level of 100 ppb (parts-per-billion) annual average and in the U.S. to a level of 80 ppb.

THMs form in distribution systems over time with chlorine disinfectants (added to prevent harmful biological growth) and in the presence of naturally occurring organic material with increasing frequency as water temperatures rise. As water age increases (the time from water treatment in a plant to ultimate use), THM formation progresses and water utility operators closely monitor their system's running THM average.

In 2016, the Manitoba Water Services Board issued a request for a THM pilot study to assess whether available technologies could mitigate THM formation in its Plumas Tank which is roughly 100,000 gallons (400 m<sup>3</sup>) in volume. In 2014, the Board observed steadily increasing THM levels of over 200 ppb and had already started to test the removal of soluble organic material (one of the THM precursors) but realized that the detention time in the tank and the inherent water age in a 60-mile (96-km) pipeline would result in a significant level of THM formation, even with organics removal.

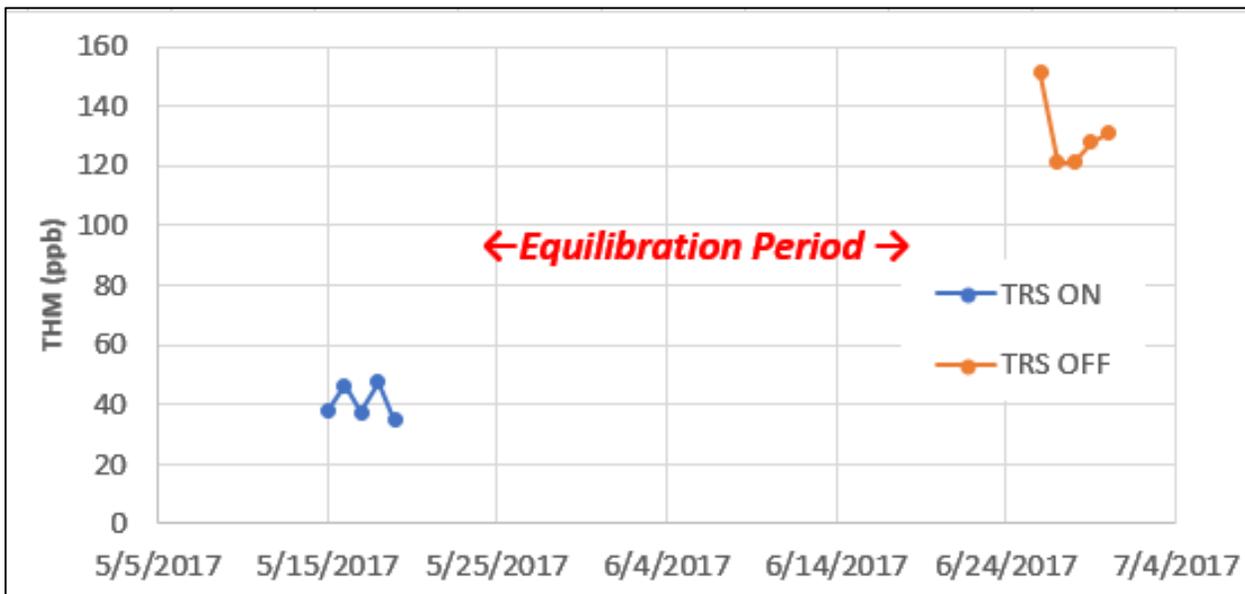


UGSI Solutions, Inc. subsidiaries, PSI Water Technologies, Inc. and PAX Water Technologies, Inc. (PAX) were selected to perform the one-year pilot test to strip THMs from the Plumas tank. With over 150 systems in operation, PAX had significant experience in utilizing water storage assets as intervention points to eliminate THMs in distribution systems. Essentially, the PAX TRS™ system uses the water reservoir as a reaction vessel to enhance the volatilization of THM compounds from the liquid phase (water) into the gas phase (headspace of tank) and move them out of the tank. The PAX TRS™ system of components, which include submerged mechanical tank mixers,

rooftop ventilation units, and water surface aerators all play a role in moving THMs from being trapped in the tank water into the headspace and out of the tank.

By utilizing Henry’s Law and various mass transfer principles in the PAX Neptune™ equipment selection tool, the engineering team at PAX was able to add an economical level of capital equipment and power to achieve desired THM removal rates. Factoring in the sub-zero temperatures, the PAX team added an air heater to the Powervent® ventilation unit to ensure that frigid air was not blowing into the tank during the winter and creating unwanted icing issues.

After three days of installation and commissioning, the PAX TRS™ unit started-up and delivered results. The installation validation data shown in the graph below shows that the system is delivering 69% reduction in TTHMs.



Summer period illustrating 69% THM removal rates in Plumas Tank

Tyler Foxtan – The Manitoba Water Services Board:

*“The PAX TRS™ system was easy to install and performed well by delivering a level of THM removal that helps ensure our system compliance.”*