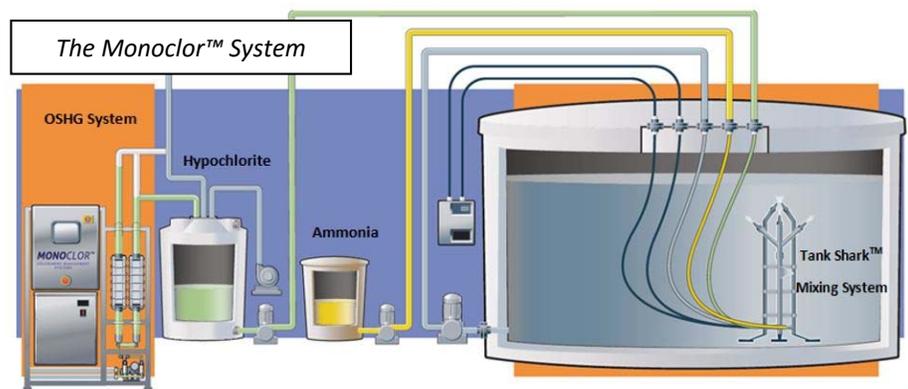


Monoclor™ Chloramine Residual Management System Manages Residual for Problematic 5.5 Million Gallon Tank for Eastern Municipal Water District

Eastern Municipal Water District (EMWD) serves about 142,000 customers in Riverside County, California. The EMWD service area is one of the largest for any water district in arid southern California. On the drinking water side, EMWD manages two water treatment plants and over 15 reservoirs. With 70% of the district's water coming from the Metropolitan Water District with chloramine disinfection, EMWD has become reliant on chloramine disinfection to manage long transmission lines and longer detention times due to on-going water scarcity.

As is common in systems utilizing chloramines for secondary disinfection, EMWD experiences chronically low disinfection residuals at certain points in their distribution system – especially in warmer months. In 2016, UGSI Solutions partnered with EMWD to pilot the Monoclor™ chloramine residual management system at one of the two 5.5 million gallon Landmark reservoirs.

The site has two 5.5 million gallon tanks with a common inlet and outlet. The site was ideal for performance comparison as one tank could act as a control to the other tank utilizing the trailer mounted Monoclor™ system.

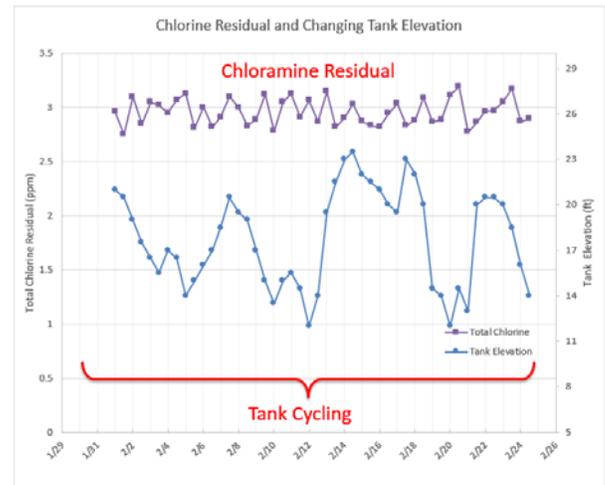
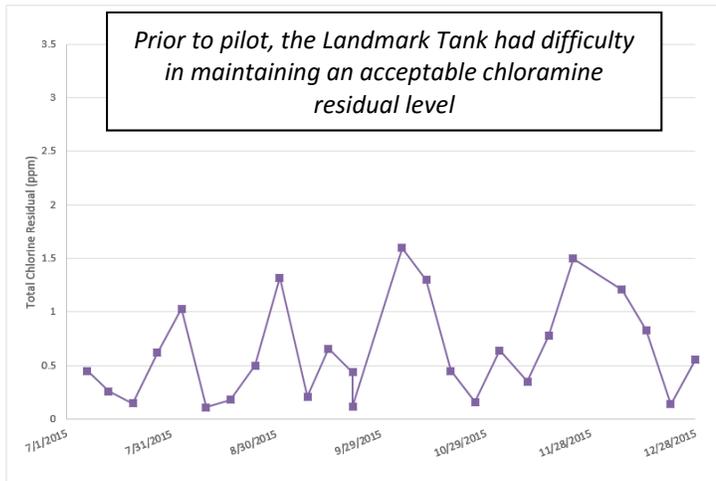


Inside the Monoclor™ trailer, the Microclor® OSHG

The EMWD Monoclor™ trailer used a skid-mounted Microclor® onsite sodium hypochlorite generator (OSHG) that provided up to 40 pounds per day of chlorine equivalent, a liquid ammonium sulfate feed system, and a Tank Shark® reservoir mixing system which provided 150 gallons per minute of mixing energy inside of the reservoir. A water booster pump was not required because EMWD had water pressure available at the site. The maintenance of the tank's chemical equilibrium was aided by the use of liquid ammonium sulfate and a constant concentration of 0.8% sodium hypochlorite from the OSHG for monochloramine generation. The chemical metering pumps were all located inside the trailer with chemical feed tubing leading to the Tank Shark® mixer in the reservoir.

Installation of the Tank Shark® mixer (which has no moving parts or electrical components) did not require divers because the unit was installed through the 36" x 36" reservoir hatch.

Historically, the chloramine levels at Landmark have varied between 0.2 mg/L and 1.5 mg/L. EMWD challenged the Monoclor™ system to increase and maintain the chloramine level to 3.0 mg/L. After reaching break-point (the point at which all chlorine demand in the tank is met), the Monoclor™ system brought the entire tank to a chloramine residual of 3.0 mg/L (from 0.0 mg/L) in less than three days.



With the Monoclor™ system, the Landmark Tank maintained the chloramine residual set-point

Challenged with significant, but normal tank cycling from 12 feet in elevation to almost 23 feet in elevation, the Monoclor™ system maintained a nominal chloramine 3.0 mg/L residual level for the two month pilot period. Importantly, the higher residual level in the reservoir had the expected positive impact on water quality in the surrounding distribution system. With better water quality and less operations labor devoted to testing and tank boosting, EMWD has incorporated the Monoclor™ chloramine residual management system as part of their water quality management options for new reservoirs.

"I liked the Monoclor™ system, it managed residuals automatically and we saw a difference in the distribution network water quality. I'd be glad to discuss it with anyone who has questions"

Joe Howell, EMWD Distribution Supervisor