

CASE STUDY

# CITY OF DESOTO

Automated Disinfectant Residual Control Trailers Enable Desoto, Texas to Quickly Gain Control Over Water Quality



Monoclor® RCS residual control trailer adjacent to the 5MG Westmoreland Tank

## OVERVIEW

Like thousands of cities throughout the United States, the City of DeSoto purchases treated water from a nearby wholesaler. In this case, the wholesaler is Dallas Water Utilities or DWU.

DWU operates three surface water treatment plants and disinfects treated water with chloramines, which are less reactive than free chlorine and result in fewer disinfection byproducts (DBPs). Formed by reacting ammonia and chlorine, chloramines are a very effective disinfectant and typically have a high level of persistence in water systems with high water ages.

## SITUATION

The challenge for DeSoto is managing complex water chemistry in a distribution system with over 200 miles of pipeline and millions of gallons of stored water, all while meeting increasingly stringent state and federal quality standards for drinking water. One downside of chloramines is that the disinfectant molecule can break down over time and liberate free ammonia, which can then become a food source for nitrifying bacteria – leading to tank nitrification.

Operators at DeSoto were manually dosing chemicals into storage tanks in an attempt to boost residual levels. They were raising and lowering tank levels (a practice known as “deep cycling”) or they were flushing millions of gallons of water from the tanks to bring in fresher water with higher levels of residual disinfectant.

Manually dosing tanks in a chloraminated system is problematic given the complex water chemistry – sometimes known as break-point chemistry. In addition to the cost of wasted water purchased from the wholesale water provider, deep cycling and flushing can leave communities vulnerable in the event of an emergency if there is insufficient water available for firefighting.

Over the years, operators at DeSoto Water Utilities focused on one particularly problematic area that experienced chronic low residual levels - a dead-end in the distribution system. Utility operators would routinely flush water, sometimes for weeks, in an attempt to restore acceptable disinfectant residual levels. So, seeing as the city’s only avenues to meet the standards placed on them are laborious and time consuming, they looked into what neighboring cities were doing to maintain a desired residual setpoint in the water storage tank.

*Within six months of putting the Monoclor® RCS system into operation, DeSoto Water Utilities flush 90% less than they did before - saving operators time and valuable purchased water.*

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# APPROACH

The City contracted with a local engineering consultant that was familiar with an automated residual control system operating in the neighboring City of Coppell. **Coppell's solution, which had been installed more than a year earlier, utilizes a Monoclor® RCS system that combines powerful tank mixing with continuous on-line water analysis and uses a "smart control" system that manages chemical dosing to maintain a desired residual setpoint in the water storage tank.**

Officials from DeSoto Public Utilities rented two 20-foot mobile trailers equipped with the Monoclor® RCS residual control systems. The two trailers contained water quality sensors, PLC-based control centers, chemical feed skids and chemical storage tanks containing bulk sodium hypochlorite and liquid ammonium sulfate inside the trailer.

Powerful PAX submersible mixers were deployed inside each water storage tank to ensure that the water inside the tanks was well-mixed and chemically homogeneous. City officials chose to lease the fully equipped trailers in order to get the residual control systems up-and-running quickly and avoid the lengthy waiting period for permitting and design.

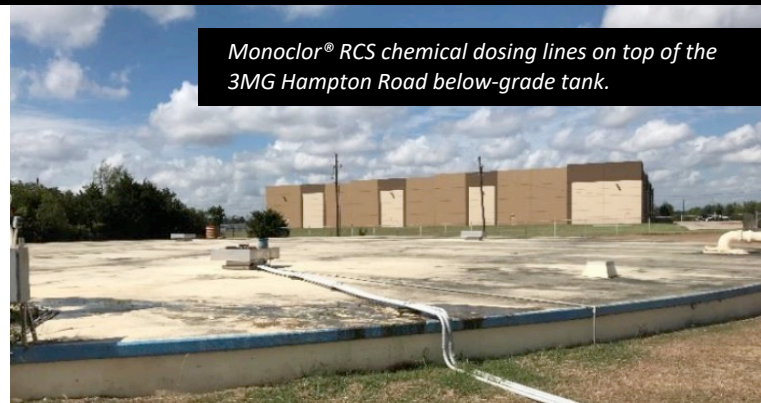
# CHALLENGES

The discussions regarding the implementation of the RCS system were a bit complicated. Considering the complexity of the system, and how it was intended to be used by the City of DeSoto, designing and manufacturing it would be somewhat difficult and time-consuming.

After discussing the terms with city officials, they chose to lease the two trailers, as opposed to going back to their old methods of treating the water, while their new systems were being designed. As a result, the leased trailers allowed time to design and manufacture the new system, while also improving the water quality.

*"Ever since we installed the Monoclor® RCS, I have much more confidence that we can maintain a meaningful residual throughout our distribution system."*

Allan McDonald  
Manager of Utility Services, City of DeSoto



Monoclor® RCS chemical dosing lines on top of the 3MG Hampton Road below-grade tank.

# RESULTS

90%+

LESS  
Flushing

8:1

RATIO  
Of Chlorine to Ammonia,  
Much Higher than the  
Typical Ratio

- Both systems were on-line and had delivered a quick ramp up to the desired residual setpoint of between 3.2 and 3.5 ppm after a few months of operation.
- The RCS system became fully operational less than 6 months after initial installation.
- Water level in both tanks can now be maintained at higher levels, providing additional water on-hand in case of an emergency and returning the tanks to their intended hydraulic capacity
- The feed ratio for the dosing pumps was adjusted to 8:1 (chlorine to ammonia) at the Westmoreland Tank and 10:1 at the Hampton Road Tank. Traditional ratios are typically 5:1 chlorine to ammonia by weight or 1:1 molar ratios.

# CONCLUSION

Within six months of putting the Monoclor® RCS system into operation, DeSoto Water Utilities flush 90% less water - saving operators time and valuable purchased water. In addition, water levels in both tanks can now be maintained at higher levels, providing additional water on-hand in case of an emergency and returning the tanks to their intended hydraulic capacity. Most importantly, the utility was able to maintain consistent disinfectant residual levels in compliance with water quality regulations. Leasing the two trailers enabled the City to maintain compliance while working on a long-term plan to procure, permit and construct two buildings to house permanent Monoclor® RCS systems for the Westmoreland and Hampton Road tanks.