

White Paper: Addressing the Negative Impact of Water Conservation Programs on Water Quality in Distribution Systems through Technological Investments

Summary

Water conservation programs are essential for the preservation of water sources, especially in times of drought. These programs include initiatives such as the adoption of efficient equipment, limiting irrigation, promoting drought-tolerant landscaping, and enforcing mandatory reductions in water usage. However, while these measures are crucial for saving water, they inadvertently lead to diminished water quality within distribution systems. This paper discusses the adverse effects of reduced water usage on water quality, the challenges faced by distribution system operators, and the importance of incorporating technological solutions to mitigate these issues.

Introduction

Water conservation efforts are critical for the sustainable management of water resources. During drought conditions, these programs become a priority for water utilities, aiming to reduce water consumption through various initiatives. Despite their benefits in preserving water sources, these programs can negatively impact water quality in distribution systems, posing challenges that need to be addressed by water operators to ensure the delivery of safe drinking water.

Negative Impact of Water Conservation on Water Quality

The reduction in water usage leads to an increase in water age within the distribution system, which has several detrimental effects on water quality:

- **Increased Water Age:** Conservation efforts result in lower turnover of water in the system, increasing the time water spends in pipes and storage tanks.
- **Degradation of Disinfectants:** Chlorine and chloramine, commonly used disinfectants in water treatment, are not persistent and degrade over time. Their degradation is accelerated by factors such as higher water temperatures and the presence of biofilms, nitrification, and water intrusions, making it challenging to ensure the minimum disinfection of the water supply.
- **Exacerbation of Water Quality Issues:** The direct correlation between water age and the degradation of disinfectant residuals means that successful water conservation programs can inadvertently create or exacerbate water quality problems.

Challenges and Common Practices

To combat the negative effects of increased water age, operators have traditionally employed strategies such as limiting storage capacity and flushing systems with high water age water. However, these practices have their drawbacks, such as compromising fire protection and contradicting the principles of water conservation, respectively.

Technological Solutions: The Role of Monoclor® RCS

In response to these challenges, innovative solutions like the Monoclor® RCS have been developed. This proven technology is designed to control water quality in drinking water storage tanks by "resetting" the water age, thus maintaining or even improving water quality to levels comparable or superior to that of water leaving the treatment plant. By implementing the Monoclor® RCS in strategic locations within the distribution system, the impact of water conservation initiatives on water quality can be significantly mitigated.

Planning and Investment

The success of water conservation programs should not come at the expense of water quality. It is crucial for water conservation strategies to include measures for addressing the potential degradation of water quality due to reduced water usage. Planning and budgeting for the implementation of technologies like the Monoclor® RCS are essential steps towards ensuring the sustainability of water conservation efforts and the continuous provision of safe drinking water. This approach underscores the importance of investing in innovative solutions to address the challenges posed by water conservation.