
Transitioning from Chlorine Gas to Sodium Hypochlorite Disinfection

Water treatment facilities play a critical role in protecting public health by ensuring drinking water is properly disinfected before it reaches customers. One important modernization effort at the City of Cheyenne Board of Public Utilities' (BOPU) R.L. Sherard Water Treatment Plant was the recent conversion from chlorine gas disinfection to sodium hypochlorite disinfection.

The R.L. Sherard Water Treatment Plant (WTP) began serving Cheyenne residents and businesses in the spring of 2002, replacing both the original Sherard facility and the historic Roundtop WTP. Designed with advanced treatment processes and a capacity of approximately 32 million gallons per day, the facility was built to meet Cheyenne's growing needs and comply with current and future safe drinking water requirements.



Today, the R.L. Sherard WTP continues to be an important part of Cheyenne's water infrastructure, treating surface water from its Southern Wyoming reservoirs and blending it with groundwater to provide safe, reliable drinking water. The facility continues to undergo improvements and modernization to ensure it can serve Cheyenne well into the future.

In 2023, safety concerns arose at the Sherard WTP following a chlorine gas leak. While the emergency chlorine gas scrubber system contained the leak to the WTP, the incident highlighted the risks associated with the existing chlorine disinfection process and the need to implement a safer, more reliable method for drinking water disinfection.

Chlorine gas has long been an effective and economical disinfectant for municipal water treatment. However, storing and handling chlorine gas presents significant safety and security concerns. Chlorine gas is highly hazardous and can pose serious risks to employees, first responders, and surrounding areas if accidentally released. These risks require extensive safety procedures, specialized equipment, emergency response planning, and regulatory compliance.

Sodium hypochlorite provides an effective alternative for drinking water disinfection. When properly applied, it produces



the same disinfecting agent—free chlorine—needed to eliminate harmful bacteria, viruses, and other microorganisms. By converting to sodium hypochlorite, the BOPU Sherard WTP can maintain reliable disinfection while reducing the risks associated with storing and utilizing pressurized chlorine gas.

In addition to improving safety and reliability, the transition to on-site sodium hypochlorite generation provides the BOPU with an opportunity to significantly reduce the costs associated with using chlorine gas for disinfection.

In 2024, BOPU entered into a contract with Burns & McDonnell for design of the project and Creston Water Solutions which supplied three (3) hypochlorite generators along with all the equipment necessary to provide a complete, functioning system. This new disinfection system allows sodium hypochlorite to be generated on-site, reducing the facility's reliance on chlorine gas. In 2025, Velocity Contractors was awarded the construction project with a total contract bid approximately \$350,000 below the engineer's estimate. Construction began in January 2026, marking the start of the physical transition to the new disinfection system. September 9, 2026, on-site generated sodium hypochlorite was successfully delivered to Cheyenne's drinking water system. The total project cost came to approximately \$4 million, with \$3 million paid for with reserve funds from rates and fees, and the remaining \$1 million was acquired through an American Rescue Plan Act (ARPA) grant. This represents a substantial investment in the safety, reliability, and long-term operation of the Sherard WTP.



While providing safe and reliable drinking water remains a top priority for the BOPU, cost efficiency and operational effectiveness are also important considerations. The ability to produce sodium hypochlorite at the Sherard WTP using readily available salt provides a predictable and potentially more cost-effective approach to meeting disinfection needs.

In 2015, the BOPU contracted to receive chlorine gas at a rate of approximately \$0.22 per pound, resulting in an annual cost of approximately \$16,500. Five years later, in 2020, the cost had increased to approximately \$0.33 per pound, with an annual cost of approximately \$23,500. Due to continued inflationary pressures, further price increases were expected. BOPU's financial records indicate that, by 2025, chlorine gas was purchased at approximately \$1.22 per pound, resulting in a significant increase in annual costs to approximately \$77,000.

With the implementation of the new on-site generation system, the BOPU will instead use salt to produce sodium hypochlorite. The on-site generators require approximately three (3) pounds of salt to produce the equivalent of one (1) pound of chlorine. BOPU recently purchased a load of salt at a rate of approximately \$0.17 per pound, resulting in an estimated cost of approximately \$0.52 per pound of chlorine produced. Based on BOPU's chlorine usage from 2021 through 2024, Burns &

McDonnell Engineers estimated that approximately 76,000 pounds of salt would be needed annually to provide equivalent disinfection using sodium hypochlorite. At the current salt price, this equates to an estimated annual cost of approximately \$13,250. This represents a substantial annual cost savings of nearly \$64,000 compared with the \$77,000 cost of chlorine gas in 2025.

The BOPU remains committed to being a responsible steward of ratepayer funds while maintaining a higher standard for public health and safety. By transitioning from chlorine gas to sodium hypochlorite disinfection, we are confident this is the most cost-effective, safe, and efficient process that will maximize ratepayer dollars. BOPU's commitment is to ensure that rates and fees are used wisely while continuing to provide reliable, safe, and high-quality drinking water to our customers—today and for generations to come.

