

## CASE STUDY

**MaximOS™**  
City of Bloomfield, NM



# Bloomfield, NM, reduces chlorine dose by 30% with mixed oxidants

## Overview

The City of Bloomfield is located in the northwest corner of New Mexico. At the time, the water utility served a population of 7,000 people with a total of 2,500 connections. The peak flow during the summer was approximately 2.7 million gallons per day. The water would come through a river diversion into an 84-acre feed reservoir before reaching the plant.

The treatment plant is located right next to a residential neighborhood, and the fear of a large chlorine leak was a major concern. In addition, the operators themselves hated using chlorine gas due to the potential for a poisonous gas leak.

In November of 1998, Bloomfield purchased a MIOX-500 on-site mixed-oxidant generator with a total capacity of 50 pounds of free available chlorine (FAC) per day and 70 pounds of chlorine equivalent per day. The generator eliminated the dangerous chemicals typically associated with water disinfection.

## Challenge

Improve operational safety at the plant for the protection of both the workers and the community by eliminating hazardous chlorine gas.

## Solution

Installation of the MIOX-500 generator eliminated chlorine gas. Mr. Ruybalid comments: “We’re happy as heck we bought it! We’re really pleased with the system and happy with the responsive service from the MIOX people. We wouldn’t go back to chlorine gas even if it were furnished for nothing. We did not like chlorine gas—we never felt safe.”

## Results

**Safety** – The water plant operators and the residential community no longer have to worry about a poisonous gas in their midst. The mixed oxidant (MOS) system uses only salt and water as a feed stock, and the solution produced is so dilute that the operators can run their hands through it without burning their skin. They never felt safe with chlorine gas, but with MOS, had no concerns whatsoever about the safety of their water plant.

**Chlorine Dose/Residual** – The plant was able to cut back their dose by 30% from 2.0 ppm to only 1.4 ppm to maintain a 1.2 ppm residual at the end of the distribution system. With the MOS installation, their goal was to eventually get the injection rate down to 1.0 ppm. In addition, the plant had to run for a few hours every morning after its nightly shutdown to get the residual back up to the required level in the distribution system. With MOS, they lost virtually nothing overnight, and the plant was immediately operational.

COMPARISON	Gas Chlorine (before)	Mixed Oxidants (after)
Chlorine Dose/ Residual	2 ppm FAC clearwell dose required for 1.2 ppm residual at the end of distribution. Plant had to run for hours in the morning to get residual back up.	Clearwell FAC dose reduced 30% to 1.4 ppm for 1.2 ppm residual at the end of distribution. Residual does not dissipate - plant is operational immediately in the morning with no loss of residual overnight.
Safety	Potential for chlorine gas leak into residential neighborhood. Dangerous for operators.	No hazardous materials produced, used, transported, or stored. No need for further HAZMAT training. Liability exposure reduced.
Regulations	Use of 1-ton gas cylinders may have required submittal of RMP or PSM plans.	No need to submit RMP or PSM plan. No special training or safety equipment required.
TTHM Formation	TTHMs were within current regulatory limits, but could have been an issue in the future.	TTHMs are not of concern with current regulatory limits, nor will they be if limits are reduced even further.
Ease of Use	Need for \$800 safety suits, repeated HAZMAT training, self-contained breathing apparatus, dealing with regulations, and changing out cylinders.	Easy to run, user friendly. Only add salt and perform routine maintenance checks. Operators were trained in 1 day.
Operating costs	Chlorine required water for injection into the system.	Savings on water usage since MIOX does not consume water. Overall operating costs are about equal.

"We wouldn't go back to chlorine even if they offered it to us for nothing!"

Cas Ruybalid,  
Engineer

**Regulations** – The water treatment plant used 1-ton gas chlorine cylinders. OSHA requires submittal of a Process Safety Management (PSM) plan for over 1,500 pounds of chlorine stored on-site, while EPA requires a Risk Management Plan (RMP) for 2,500 pounds stored on-site. Since the MOS solution produces oxidant as needed, and the concentration is so dilute, there is no need to go through the hassle of regulatory paperwork. In addition, MOS is a better disinfectant than even chlorine, so the plant had no concerns about bacterial compliance.

**TTHM Formation** – The water plant did not have any problem with TTHM compliance. However, with the trend of reducing regulatory limits periodically, the utility was happy that would never be an issue for them.

**Ease of Use** – With chlorine gas, Bloomfield operators were outfitted in safety suits, continued periodic HAZMAT training, changed out chlorine cylinders, and dealt with regulators. With MOS, no special equipment or training was required. The operators thought the system was easy to run and very user friendly due to the automated controls. One day was sufficient to completely train them on unit operation.

**Operating Costs** – Operating costs have remained approximately the same with MOS. However, there was a big decline in water usage since chlorine required water to inject it into the system, whereas MOS does not. Chemical use dropped off dramatically, and liability exposure was also reduced.

**Success** – In the words of Cas Ruybalid, Bloomfield is “happy as heck we bought it.” They are very pleased with both the system and the service from MIOX personnel, and would not revert to chlorine even if it were offered free of charge. ■



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