

# Calcium Nitrate Replacement via SulFeLox®

## Background

Faced with increasing costs for controlling hydrogen sulfide in its wastewater collection system, the City of Bakersfield, California commissioned an evaluation of its program in 2019. The existing program using calcium nitrate dosing stations was becoming cost-prohibitive, particularly in sensitive areas where chemical demands and community sensitivities were highest. A consultant recommended evaluating the use of a more efficient treatment, such as ferrous chloride, in place of certain Calcium Nitrate dosing stations to reduce costs and improve the system's overall performance.

The City commissioned a study in 2021 to evaluate the performance of ferrous chloride dosing using SulFeLox®, a low-hazard form of ferrous chloride that is less corrosive than other ferrous chloride products. The study consisted of 12 days of monitoring the baseline Calcium Nitrate scenario, followed by 60 days of SulFeLox® dosing at different feed rates, and concluding with 14 days of no chemical dosing to establish the true baseline scenario.

## Technology

SulFeLox® is a buffered iron solution that combines the effectiveness of iron salts with the safety benefits of calcium nitrate – all at less cost. It is specifically designed to control H<sub>2</sub>S in wastewater collection systems by binding it into non-volatile ferrous sulfide (FeS). It contains no free acid and has a lower hazard rating than traditional iron salt technologies, and equal or lower than calcium nitrate, enabling use in residential and commercial areas. SulFeLox® can go anywhere nitrates can and is specifically designed to replace nitrate where it performs the worst – in long, slow-moving, sulfide generating sewers. Typical applications for SulFeLox® can substitute for nitrate on a 1:2 to 1:3 basis, meaning significantly fewer deliveries, and approximately 15-20% less cost.

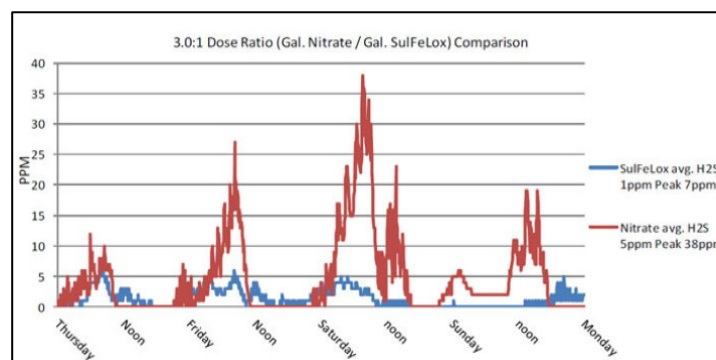
### KEY RESULTS:

>65%

Reduced Vapor  
H<sub>2</sub>S Peaks

>\$200k

Chemical Spend Savings  
per Year

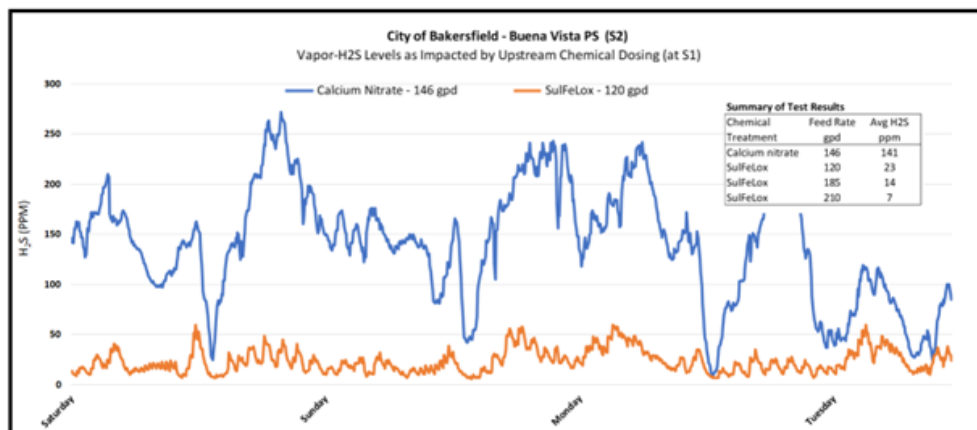


Results are examples only. They are not guaranteed. Actual results may vary.

## Performance

The SulFeLox<sup>®</sup> dosing station replaced two calcium nitrate stations. Comparing the Calcium Nitrate and SulFeLox<sup>®</sup> results showed 66-83% lower vapor-H<sub>2</sub>S peaks at the dosing site and treatment plant sites, with less benefit at a downstream site where vapors were impacted by H<sub>2</sub>S from other flows into the station. The field results confirmed the consultant recommendation that iron dosing from one site could provide improved results relative to Calcium Nitrate dosing from two sites.

Following the field test, the City continued to feed SulFeLox<sup>®</sup> at the Romero site and replaced seven other Calcium Nitrate sites with three SulFeLox<sup>®</sup> sites, reducing the total number of chemical feed sites from nine to four. The City is now spending approximately \$663k/yr for SulFeLox<sup>®</sup> to meet its system-wide performance targets, where it was previously spending \$990k/yr for Calcium Nitrate. Additionally, with a year's experience with dosing iron into the collection system, the treatment plant has observed operational benefits including the elimination of the ferrous chloride feed to their digesters for sulfide control. The City has entered into a five-year supply agreement for providing SulFeLox<sup>®</sup> iron product and related services and equipment. Future work is planned to evaluate iron regeneration ahead of the treatment plant to provide additional benefit to treatment plant operations.



## About USP Technologies

USP Technologies is the leading supplier of peroxygen-based technologies and services for environmental applications. We have been serving the water, wastewater and remediation markets for over 20 years and have offices and field service locations throughout North America. Our consultative approach to problem solving includes application assessment, technology selection and development of a tailored treatment approach. Our full-service programs successfully integrate storage and dosing equipment systems, chemical supply, inventory and logistics management, and ongoing field and technical support. This approach provides cost-effective, “hands-off” solutions to our customers. USP Technologies also can provide access to experienced application partners for a turn-key program encompassing engineering, site characterization and technology selection, program implementation, execution and report generation.