

C A S E S T U D Y

Restoring Digester Flow and Valve Operability by Dissolving Struvite with **Struviceide™ Soak**



Struvite buildup is a common but costly challenge in wastewater treatment environments, especially inside digester systems where scaling can quickly interfere with flow paths, clog critical piping, and restrict operational control. At Newtown Creek Resource Recovery Facility, struvite deposits accumulated over time on both gravity sludge transfer piping and 12" plug valves, creating a system-wide constraint that directly limited the plant's flexibility during high-demand conditions.

Newtown Creek operates eight digesters and two storage tanks that have been online since 2010. As struvite scale thickened across key routes, valves became coated and increasingly inoperable, while deposits inside gravity lines drastically reduced the amount of flow the facility could process. In peak flow situations, the facility's ability to make operational changes and maintain control is essential and struvite buildup was undermining that capability at a critical level.



The Challenge

Newtown Creek needed a reliable solution to restore performance without exposing the facility to unnecessary downtime or risk. Mechanical rotational removal was evaluated but ultimately ruled out due to the potential for damage to glass-lined vertical piping. At the same time, full pipe replacement was considered prohibitively expensive and difficult to execute. The vertical piping alone was approximately 100 feet in height and included welded, flanged, and Victaulic connections inside of digesters, many without flat surfaces suitable for modification. Logistically, replacement work could require heavy equipment access, and the use of cranes also introduced concerns related to underground utilities and site constraints.

With mechanical and replacement options presenting significant drawbacks, the facility pursued a chemical approach designed to safely dissolve struvite while keeping the plant operating continuously.

The Solution: Struvicide™ Soak

Grignard worked with Delphi Plumbing (DEP) and Newtown Creek to implement a chemical descaling strategy designed to dissolve struvite in gravity transfer piping and restore system performance. The solution selected was Struvicide™ Soak, applied at 100% concentration. Over the course of the project, more than 26,000 gallons of product were used to treat the affected infrastructure.

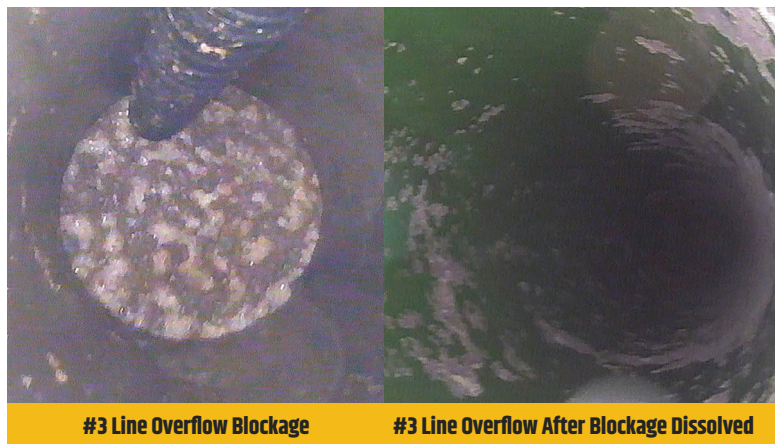
As the solution circulated, there were clear signs of progress. The liquid darkened as material dissolved, viscosity increased as solids entered suspension, and pH levels shifted as the reaction continued. These indicators confirmed that struvite was actively breaking down. At the same time, these changes required careful management. As the solution thickened, circulation became more demanding, especially over long distances and vertical runs—requiring ongoing monitoring and adjustment by the team in the field.

A Collaborative Approach with Delphi Plumbing

This project was driven by strong coordination between Newtown Creek, Delphi Plumbing (DEP), and Grignard. Delphi Plumbing led the on-site execution, performing the manual work required to route hoses, manage circulation, handle equipment, and carry out the day-to-day operations needed to apply the solution safely and effectively.

Grignard supported the effort by supplying Struvicide™ Soak, coordinating disposal of used solution, assisting with circulation equipment, and providing guidance on how to apply the chemistry within the plant's existing infrastructure. This included advising on routing strategies, connection points, circulation timing, and adjustments based on inspection results.

Throughout the project, Grignard worked closely with Delphi Plumbing and the Newtown Creek team, using field observations and system feedback to refine the approach as conditions varied from one digester to another.



Newtown Creek was handicapped by valves that were coated with struvite and struvite built up on the gravity lines that drastically reduced the amount of flow they could process through their digesters.

Implementation: Controlled Soak + Circulation Process

Because valve replacement and restoring operational control were immediate priorities for the facility, the project required sequencing that balanced infrastructure renewal with chemical treatment and inspection. This work took place while Newtown Creek continued running 24/7, making careful coordination essential.

The treatment followed a controlled, repeatable process. Newtown Creek and the project team began with an initial pipe inspection and assessment to understand restriction severity and establish realistic circulation paths. Once a route was confirmed, Struvicide™ Soak was introduced and circulated for a determined period. The system was then drained and inspected to confirm progress. Where struvite remained, the system was refilled and recirculated until target restoration levels were reached. Once piping capacity was restored to approximately 95% or better, the system was reassembled with new valves and returned to service.

This approach enabled the team to restore flow without damaging sensitive piping surfaces and without requiring invasive replacement work.

Phased Execution Across the Digester System

The project began with the valves connected to the two storage tanks, focusing on restoring the center common valve control and giving operators the ability to isolate Digester Groups 1–4 and 5–8, functionality that had been limited due to struvite

buildup on valve plugs. While struvite and sludge were observed in horizontal gravity lines, especially around welds, tees, and changes of direction, the buildup in several horizontal routes was not as severe as expected. As a result, the facility elected not to apply chemical flushing across most of the horizontal lines and instead concentrated chemical treatment where it was most impactful.

From there, the work expanded to Digesters 1–4 across both horizontal and vertical piping. These digesters had comparatively less buildup and served as the learning curve for refining chemical application steps, inspection timing, and coordination with valve replacement work. However, the project still uncovered severe restrictions, including emergency overflow and transfer lines that were fully plugged in certain areas. The team began with emergency overflow lines due to lower buildup and advantageous interconnections, then treated transfer lines one at a time with isolation achieved by removing a valve at the bottom. In one example of process efficiency, establishing a circulation route between the #1 transfer line and the #3 transfer line also resulted in cleaning a critical horizontal line leading toward the storage tanks.

The final phase focused on Digesters 4, 5, 6, and 8, areas where struvite buildup was more advanced and restrictions were severe. Some transfer lines experienced narrowing from a full 12" opening down to approximately 4", requiring extended circulation and additional inspections to reach restoration targets.

Site Challenges and Engineering Considerations

Several conditions added complexity to the project. The digester building required explosion-proof equipment, so pumps were staged outside and powered by generators. Elevation changes of up to 120 feet required high-head pumping to maintain circulation.

Delphi Plumbing managed hose routing and field setup, including adapting connections through 2" spray wash lines. Typical circulation routes extended approximately 450 feet, with some reaching up to 800 feet depending on system availability.

Results

Through repeated soak and circulation cycles, Newtown Creek achieved major functional restoration without mechanical damage risk or large-scale replacement costs. All treated vertical lines were restored to greater than 95% capacity, and critical valves were returned to functional status through coordinated replacement and cleaning efforts. Most importantly, the facility regained operational flexibility, improved reliability across its digester infrastructure, and reduced the risk of severe flow limitations during peak demand periods.



#6 Transfer Line Before 4" Opening

#6 Line After 12" Line Restored



#7 Transfer Line Before 4" Opening

#7 Transfer Line Restored

Conclusion

This project highlights the value of combining the right chemistry with experienced field execution and strong collaboration. By working together, Delphi Plumbing and Grignard helped Newtown Creek take a practical, lower-risk approach to solving a complex struvite challenge. Using Struvicide™ Soak as a targeted solution, the team restored flow capacity, improved operability, and avoided the cost and disruption of major infrastructure replacement.

About Grignard Industrial Specialty Chemical Solutions

Grignard provides specialty chemical solutions and application guidance for municipal and industrial operations facing scale buildup, flow restrictions, and performance challenges. By working alongside contractors and facility teams, Grignard helps deliver safe, effective, and practical solutions in real-world operating environments.

Got a challenging application that demands a specialized solution? Call Grignard today at 732.340.1111



Grignard Company

505 Capobianco Plz
Rahway, NJ 07065
t: 732.340.1111
f: 732.340.0111