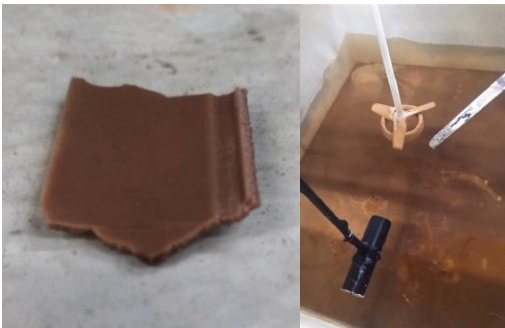


WW TREATMENT PLANT OVERVIEW

GreenTree Landfill is a gas to energy landfill located in Pennsylvania USA. Greentree has a certified waste-water treatment plant with low, neutral and high pH removal systems in place for removal of metals. NPDES permit to discharge treated landfill leachate, on site gas well water generated as part of the landfills gas extraction/gas purification process, septic waste, and trucked in non-hazardous liquid waste



Leachate Scale Affecting; Tanks, Mixers, Pipes

HOW WAS SCALING AFFECTING THE OPERATIONS?

There were two types of scaling which need to be dealt with. The first is in the landfill leachate collection/conveyance system. The other is scaling due to the treatment of the leachate.

HOW WERE YOU MANAGING IT?

Collection pumps were replaced, when necessary, lines were jetted as necessary in the collection system. At the treatment plant ports are installed for acid cleaning, and processes are taken offline for cleaning. Excessive down time, equipment repair, and labor was the “norm”. Descaling chemicals were added to extend operation life between down times.



Leachate Holding Tank Line Treatment

OPERATOR BACKGROUND

Thad Sorg: bachelor degree in biology, former instructor/troubleshooter for Pa. Operator Outreach Program.

11+ years POTW, 32+ years leachate treatment operations

Jim Beyer: Chemistry degree and class 1 certified waste-water treatment operator. Jim 10+ years in hazardous wastewater treatment remediation, 10+ years operations at Greentree

OPERATIONAL CHALLENGES

“Keeping the water moving”; The biggest challenge was treating the daily leachate from the landfill plus outside liquids in a costly and efficient manner. The treatment plant is a “complex critter” that renders itself by nature due to pH needed levels in the matrix to scaling. To maintain consistent operating flow, chemicals and or manual removal of scaling was continually necessary.

A renewal NPDES permit contained new parameters which are regulated by the TMDL of the receiving discharge stream. It was immediately recognized that meeting the new limit would require significant changes to the existing chemical treatment processes and these changes would also trigger a change in the existing O&M practices.

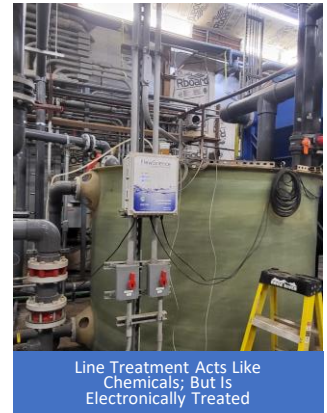


“The most significant benefit of the FlowScience LSC Systems to the landfill unfortunately is the most difficult to explain without going into a lot of technical jargon.” “The ability to achieve effluent compliance of a water-quality based effluent limit (manganese) without experiencing crippling scaling is huge.”

When Flow is Imperative and All Else Fails; FlowScience Innovation Succeeds

WHY DID YOU DECIDE TO TRY FLOWSCIENCE?

Through bench testing we discovered that in order to meet the new permit conditions we would need to stop adding the descaling chemical for it interfered with removal of a regulated parameter. Our investigation showed evidence that FlowScience was the only choice proven and available to control scaling. We could find no chemical additive which would control scaling and provide required treatment. In short, the FlowScience equipment made compliance “doable” with out being stuck with downtime and manual cleaning.



Line Treatment Acts Like Chemicals; But Is Electronically Treated



HOW MANY FLOWSCIENCE SYSTEMS ARE INSTALLED/WHERE?

Currently we have two double channel units installed to aid in leachate conveyance from storage tanks to the treatment complex. At our high pH end of treatment, we have 7 double channel 2XL units and 1 one channel unit. Treatment Pads have been strategically placed on piping networks to charge and re-charge leachate throughout the facility and are adjusted according to conditions. Additionally; a Reaction Chamber System was installed in a particularly high precipitation treatment basin.

HOW HAS FLOWSCIENCE CHANGED YOUR OPERATIONS?

Since the installation of the FlowScience LSC equipment, we have stopped using chemical descaling additives entirely and reduced downtime for cleaning dramatically (it was a miserable job and laborers were difficult to retain). On the hi pH end of treatment cost for descaling chemical ranged from \$300 to \$1,300 per day depending on the volume and quality of the water treated



De-scaling Chemicals Eliminated Completely



Compliance Targets Achieved



\$300-\$1300 Per Day in Chemical Savings Achieved: 6-Month ROI

WOULD YOU RECOMMEND FLOWSCIENCE?

I would recommend anyone that has scaling issues to give FlowScience a try. In Greentree’s case it has made **the extremely difficult into a very doable situation**. The service has been great, we always get advice when we need it quickly.



Mini Reaction Chamber For Tank Protection



FlowScience Works by Charging Leachate, Changing It’s Attraction Path While Activating the Naturally Occurring Bi-Carbonate into a Mild Acidic Presence

FlowScience A Sustainable Solution 

SCALE CONTROL TECHNOLOGY