



CASE STUDY

The 4never™ Solution Destroying PFAS in Landfill Leachate

THE CHALLENGE

A leading waste disposal company manages multiple landfills that have accepted waste streams containing PFAS, or per- and polyfluoroalkyl substances, for a number of years. Due to their nature as “forever chemicals”, the PFAS chemicals never broke down and caused contamination levels to grow over time. This has led to high levels of PFAS detected in the leachate.

One landfill of concern for the waste disposal company is located in Michigan, where state regulations on PFAS are already established and enforced. The regulations impact the discharge of any treated leachate collected from the landfill, which ultimately get processed by publicly owned treatment works (POTWs) and put back into public waterways.

Because PFAS is considered a forever chemical, the waste disposal company was looking for sustainable methods to safely manage the contaminated leachate with no risk of impacting the environment. That's when the 4never™ team entered the picture, ready to collaborate with the waste disposal company and find a solution to the challenge that met their specific business and sustainability goals.

THE SOLUTION

The 4never™ team brought their flexible solution for deployment to determine the best process for combining the PFAS remediation steps of separation, concentration, and destruction. Based on facility locations, it was determined that the contaminated landfill leachate would be transported in bulk for treatment at one of Crystal Clean's wastewater treatment facilities located in Grand Rapids, MI.

The Crystal Clean facility housed and operated the necessary technology to separate, concentrate, and eliminate PFAS from the contaminated leachate. The leachate was first processed through a SAFF® unit, separating the PFAS from the contaminated leachate and creating a PFAS hyper-concentrate and discharging treated water. The SAFF® unit used low energy and minimal consumables during the treatment process.

The PFAS hyper-concentrate was then prepared to eliminate the PFAS. The destruction method chosen by the waste disposal company was supercritical water oxidation (SCWO), which uses high heat and pressure to break down and destroy PFAS. After destruction through SCWO, all that was left was water, carbon dioxide, and inert salts.



THE RESULTS

The leachate processed through SAFF® produced an average concentration and volume reduction factor of 1,000x from the raw leachate inputs. After separating the PFAS from the leachate and creating the PFAS hyper-concentrate, the treated water discharged from the SAFF™ unit had PFAS levels well below established discharge limits. Concentrations of non-PFAS parameters were compliant with the municipal discharge permit requirements.

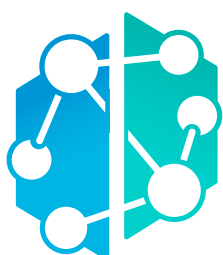
The PFAS hyper-concentrate processed through SCWO achieved a 99.9% success in eliminating the targeted PFAS. Potential and measured vapor/air emissions were determined to be well below applicable thresholds that would require permitting of the units.

The project's ongoing success showcases the capabilities, efficiency, and flexibility of the 4never™ solution. 4never™ is a hands-off, turnkey solution that is built around meeting your unique business and sustainability goals when it comes to managing waste streams containing PFAS. 4never™ removes distractions from your business, prepares you for compliance with upcoming PFAS regulations, and offers you a sustainable solution to the problem of PFAS.

MEASUREMENTS

	PRE-TREATMENT	POST-TREATMENT	MICHIGAN REGULATIONS
PFOA	2,330	3.8	22
PFOS	592	ND	12
PFHxS	9,350	ND	51
PFNA	91.5	ND	6
PFHxA	1,120	ND	400,000
PFBS	9,740	13	420

*All units are in ng/L (ppt)



4never™

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