

Case study

FOAM-X™ Foam Fractionation Paired with PFASigator™ PFAS-Destruction Technology Successfully Treats PFOS to Non-Detect with No Off-Site PFAS Disposal

CHALLENGE

Historic PFAS contamination in a Michigan industrial facility required a pump-and-treat solution for PFAS remediation of site groundwater. Perfluorooctane sulfonate (PFOS) concentrations averaged 1650 ng/L, exceeding local POTW limits of 28 ng/L. We targeted the following goals:

- Treat PFOS in pumped water to <28 ng/L
- Concentrate PFAS in foamate stream >1000x

We teamed with Ensired Solutions® to deploy their PFASigator™ technology for destruction of the PFOS-concentrated foamate.

SOLUTION

Our FOAM-X™ pilot skid, designed to treat flows between 2-5 gallons per minute (GPM) using [foam fractionation](#), was deployed to site for PFAS treatment. The FOAM-X foam fractionator uses air injection to remove PFAS from water and concentrate PFAS into a low volume waste “foamate”, which can then be destroyed or disposed. A two-stage foam fractionation strategy was employed on-site that could simulate a full-scale continuous flow treatment. We evaluated multiple operational parameters, including FF-Boost chemical additives, system flow rate and fractionation air injection rates to optimize system performance for both PFOS removal as well as PFAS-waste volume minimization.

Foamate produced during the pilot was fed to Ensired Solutions® PFASigator pilot unit, co-located on-site. The PFASigator uses photo-activated reductive fluorination (PRD) to destroy PFAS on-site, in a safe and cost-effective manner. Destruct effluent was returned to the head of the FOAM-X treatment system, completing a zero-waste treatment/destruction loop.



RESULTS

This process successfully demonstrated a zero-waste PFAS treatment pairing FOAM-X foam fractionation with foamate waste destruction by Enspired Solution®'s PFASigator.

- Under optimized trial conditions, PFOS was non-detect (< 2.1 ng/L) in the Foam-X treated water
- The PFASigator destroyed > 99.7% of PFOS in the foamate
- A closed loop system that didn't generate any waste requiring offsite disposal was demonstrated

We treated approximately 43,000 gallons of PFAS-impacted water and demonstrated PFOS bulk removal in excess of 99.8% removal by mass. This project achieved the PFOS treatment objective of 28 ng/L in a single foam fractionation stage of treatment, and further reduced PFOS to non-detect with a second stage. Depending on customer preference for treated water goals, this provides system sizing flexibility.

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