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Weekly Newsletter
from Agresource Inc.
for turning waste into
opportunity

Whole Cycle Tuesday



"Nature does not hurry, yet everything is accomplished."
– Lao Tzu

Takeaway

For landfill operators and receiving wastewater facilities, foam fractionation offers a useful opportunity to reduce PFAS loading and focus further treatment on a smaller stream. Its value depends on matching the technology to the leachate and having a workable plan for both streams leaving the process.

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Foam Fractionation and PFAS Reduction in Landfill Leachate

Landfill leachate—the liquid collected as water moves through buried waste—can contain PFAS released from discarded products and materials. These persistent compounds present a challenge because conventional biological wastewater treatment does not reliably destroy them. Foam fractionation offers a way to separate many PFAS from leachate before the liquid moves on to further treatment.

How bubbles help remove PFAS

Many PFAS behave like surfactants, collecting at the boundary between air and water. Foam fractionation takes advantage of this behavior by introducing fine bubbles into a treatment vessel. As the bubbles rise through the leachate, certain PFAS accumulate on their surfaces and become concentrated in foam at the top.The foam is collected and allowed to collapse into a liquid called foamate. This produces two streams: a larger volume of treated leachate with lower concentrations of susceptible PFAS, and a much smaller volume containing the concentrated chemicals. Additional foam fractionation stages can further concentrate that smaller stream.

How effective is the process?

Performance depends heavily on which PFAS are present. Longer-chain compounds generally collect more readily on bubbles, while shorter-chain compounds tend to remain in the water. A continuous pilot study using actual landfill leachate achieved greater than 90% removal for individual long-chain PFAS, but less than 30% removal for certain short-chain compounds. This distinction matters: strong removal of PFOS or PFOA does not necessarily mean equally strong removal across the full PFAS mixture.

Treatment time, airflow, staging, and leachate chemistry influence results. Research has shown that selected surfactant additives can improve short-chain removal, although their use introduces additional treatment considerations. Testing the actual leachate is essential when evaluating a system.

Separation is only part of the solution

Foam fractionation concentrates PFAS; it does not destroy them. The collected foamate still needs a defined treatment or disposal destination. Researchers are evaluating combinations of foam fractionation and destruction technologies to address this concentrated stream.