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Case Study: Landfill Leachate and Wastewater PFAS Treatment System

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A design-build case study for Waste Connections.

Morgan Sykes

Many landfill owners and operators face higher costs and fewer options for landfill leachate and wastewater disposal. In some cases, publicly owned treatment works (POTWs) impose PFAS maximum contaminant level (MCL) limitations on leachate received at their facilities, increasing their charges or refusing it altogether. These developments are partly due to stringent regulationsand/or potential future liability issues, and now, there is a need to address PFAS.

The regulatory landscape for PFAS is swiftly evolving, with numerous states setting or updating PFAS standards to address emerging concerns and research findings. Managing PFAS in landfills requires a comprehensive approach that includes advanced treatment technologies, compliance with changing regulations, and continuous monitoring of the regulatory landscape.

1) Intake – Landfill leachate, or influent water, pumps into the equalization tank. 2) FOAM-X Fractionator – Leachate pumps into the fractionator; PFAS rises to the top as foamate. PFAS foamate gets skimmed off, and the remaining leachate pumps into the break tank. 3) Next, the leachate pumps into a second fractionator to remove any remaining PFAS.

Waste Connections Proactive Approach

Champ Landfill in St. Louis, Missouri, owned by Waste Connections, took a proactive approach, collaborating with SCS Engineers and ECT2 to design the most cost-effective solution flexible enough to meet the growing number of wastewater restrictions and PFAS standards.

SCS approached the design-build with careful planning, coordination with government agencies for permits, and effective construction management to ensure the successful completion of the project and

ECT2's system. Our team worked diligently to design and construct a treatment facility using *scalable* advanced proprietary equipment to remove PFAS contaminants from the leachate.

Leachate – Wastewater Treatment

The treatment process involves intercepting leachate wastewater at an average flow rate of 73 gallons per minute, with peak flow rates of up to 81 gallons per minute. After removal of the PFAS, the leachate wastewater discharges back to the original sanitary sewer system, where it continues to a wastewater treatment facility for final treatment.

4) A foamate tank with collected PFAS is where the bubbles in the foam pop and return to a liquid state.

The process generates a thick foam collected into a separate tank, collapsing into liquid form before passing through SuperLoader media vessels that capture the PFAS molecules.The process removes the PFAS from the liquid foamate and immobilizes it on the treatment media. Treated liquid foamate, having been stripped of PFAS, is returned to the head of the plant for reprocessing. SuperLoader media

is changed monthly to quarterly upon exhaustion of its ability to capture PFAS.

The outcomes of this project were highly successful. The new wastewater treatment facility was completed within the specified timeframe and budget, providing ECT2 with a solution to manage PFAS contamination at Champ Landfill and potentially more landfills as needed by Waste Connections. The solution provides environmental protection, ensures current and future regulatory compliance, and improves waste management efficiencies for the site by managing wastewater and leachate.

5) SuperLoaders capture PFAS from the liquid foamate stream, then discharge treated foamate to the head of the plant for reprocessing with leachate. 6) Treated leachate from the fractionator pumps (Steps 2 & 3) goes to a POTW, sewage treatment facility, or holding tank.

Utilization of a Proved Advanced Technology that Can Scale

SCS's application of advanced technology and newly developed processes implemented in the PFAS treatment facility at Champ Landfill showcase the partnership's commitment to utilizing the best available tools and technology for more sustainable solutions. At the same time, efficient processes manage complex construction projects and deliver a comprehensive solution to Waste Connections.

Morgan Sykes is Senior Project Manager with SCS Engineers.

Photos courtesy of Waste Connections.