Reference Project: Telge Återvinning

Figure 2: Photo of the SAFF40 treatment plant now installed at Telge Återvinning, Södertälje

REFERENCE PROJECT: TELGE ÅTERVINNING (TELGE RECYCLING)

Client – Telge Återvinning (Telge Recycling)
Site – Tveta Recycling Facility, Sweden
Year – 2020
Impacted Media – Leachate water
Contaminants - per-and poly-fluoroalkyl substances
Technology Employed – Surface Active Foam Fractionation (SAFF)
Treatment Rate – up to 150,000 m^3/year
Removal Effectiveness – 99,9%
Target Levels – PFOS 50 ng/l

Project details

The Tveta recycling facility's effluent is treated at a wastewater facility at Himmerfjärdsverket prior to discharge into a significant surface water body known as Himmerfjärdsverket.

The wastewater plant has been REVAQ certified since 2009. REVAQ is a certification system aimed at reducing the flow of hazardous substances to treatment plants, creating a sustainable return of plant nutrients and managing the risks on the way there. Behind REVAQ is Svenskt Vatten, LRF, Livsmedelsföretagen, Svensk Dagligvaruhandel in cooperation with the Swedish Environmental Protection Agency. The requirements for certification have now been tightened and in order for the treatment plant to maintain its certification, incoming water from the recycling facility plants must adhere to limit values for designated chemicals and thus be tolerable. As a result, the leachate from Tveta must be treated from PFOS in order to continue to be able to be led to the treatment plant that discharges to Himmerfjärdsverket.

The influent is a complex cocktail of different bacteria, nutrients and pollutants of varying composition that are also generated in large volumes – up to 150,000 cubic metres per year. Three years of trails and pilots led to SAFF being established as the solution to purify the leachate from PFAS to a level that Himmerfjärdsverket can accept.

The plant has now been running for a month and target levels of 50 ng/l have been reached at all sampling events, showing an effective treatment rate of 99,9% PFOS as well as > 97% removal for all PFAS with C6 chemistry and above (PFOS, PFOA, PFHxS, 6:2 FTS, PFHpA, PFNA).

Reference Project: Oakey, Australia – Department of Defence

Client – Australian Department of Defence
Site – Army Aviation Centre in Oakey, Queensland
Year – 2019
Impacted Media – Groundwater
Contaminants – per-and poly-fluoroalkyl substances
Technology Employed – Surface Active Foam Fractionation (SAFF) and vacuum extraction, ionic exchange resins
Treatment Rate – 250m^3/day
Removal Effectiveness – 99%
Target Levels – Australian Drinking Water – following polishing stage.

Project details

A wastewater treatment plant has been constructed to remove PFAS (per-and poly-fluoroalkyl substances) from contaminated groundwater. The SAFF system utilises the hydrophilic / hydrophobic responses of PFAS compounds in foam fractionation exploiting the inherent predisposition of PFAS compounds to adhere to specifically sized micro bubbles complimented by a patented vacuum extraction system, which successfully harvests the vast majority of foaming PFAS compounds from the surface of the foam fractionator prior to applying ionic exchange polishing resins.

The system is modular and expandable technology which can continuously treat large water volumes using minimal energy or additives.

In order to remove PFAS, the SAFF multistage process includes:

- *Pre-treatment — the installation of groundwater extraction wells, adjustment of water chemistry to optimise PFAS extraction efficiencies, and removal of cross-contaminants and dissolved and suspended solids.*
- *A multistage, continuous flow, foam fractionation procedure to rapidly remove 99% of target PFAS contaminants from the influent.*
- *Application of vacuum and solar heat processes to create a PFAS-rich, hyper-concentrate semisolid.*
- *Use of final polishing technologies to remove the remaining estimated 1% of PFAS in the treated water.*
- *Safe return of clean water to the environment following final analysis.*

Waste minimisation practices have been incorporated on site at each stage of PFAS treatment to help achieve zero waste objectives. In addition, the system incorporates solar technology to drive efficiency, minimise waste and reduce energy consumption.

With the capacity to treat systems varying in size from 500 L/h to 100,000 L/h, or more if required, the technology has shown it can remove over 99% of longer-chain PFAS molecules within 2–3 min, with longer processing times and supplementary polishing systems allowing PFAS-contaminated water to be restored to below new Australian drinking water guidelines and, in many instances, below the limits of detection.

Figure 1: Photo of the SAFF treatment plant at Oakey, Australia