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CONTAMINATED SITES 2022

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*The activity has been implemented within the framework of national project
Information and providing advice on improving the quality of environment in Slovakia.
The project is cofinanced by Cohesion Fund of the EU under Operational programme Quality of Environment.*

Demonstration and evaluation of an on-site treatment train for PFAS polluted groundwater

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PFAS = Per- and polyfluoroalkyl substances

PFAS

PFOS (Perfluorooctanesulfonic acid)



PFOA (Perfluorooctanoic acid)



Objectives of the LIFE SOuRCE project

- Effective and economic remediation solution for PFAS contaminated Groundwater
- Remove long-chain (LC-PFAS) (> 99%) and short-chain (SC-PFAS) (> 95%),
- Aiming to destroy PFAS
- EU DW Directive targets (0.1 $\mu\text{g}/\text{L}$ individual PFAS and 0.5 $\mu\text{g}/\text{L}$ for PFAS in total)
- Affordable costs (up to 0.1 $\text{€}/\text{m}^3$ treated Groundwater)
- Modular solution applicable to a broad range of contaminated site characteristics

Spanish site

- Mediterranean climate
- Firefighting foams
- 5 ug/l
- One major pollutant



Swedish site

- Temperate climate
- Landfill leachate
- 2-3 ug/l
- Other pollutants



SAFF



Surface Active Foam Fractionation

PHYTO



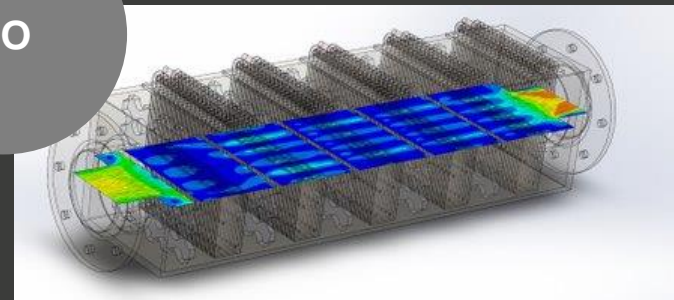
Phytoremediation

AEX



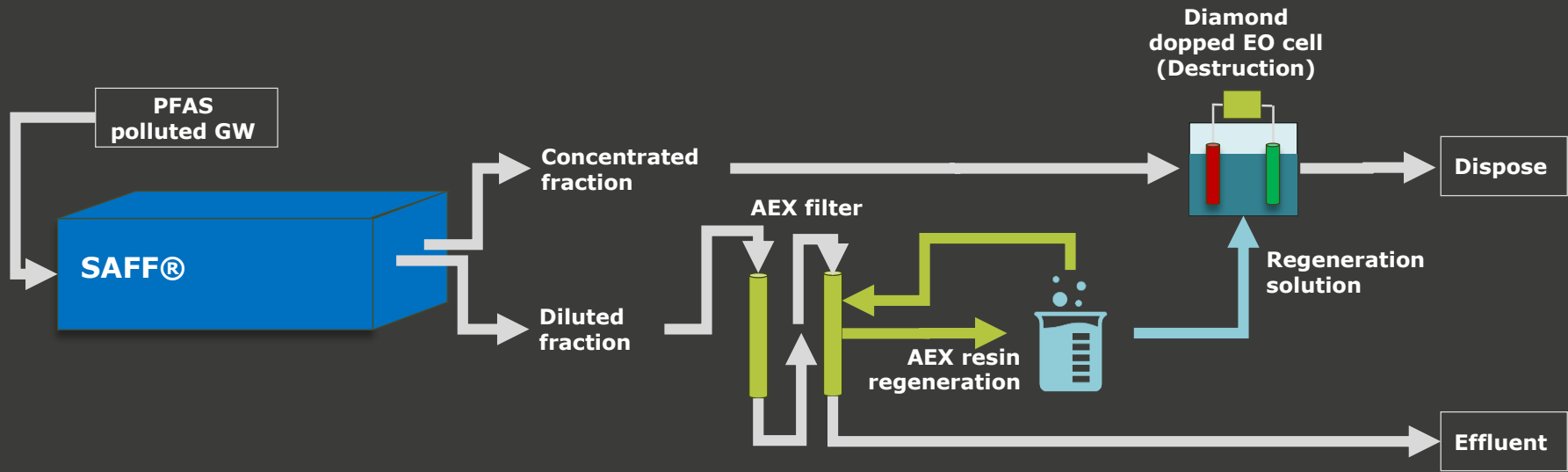
Anion Exchange Filters

EO

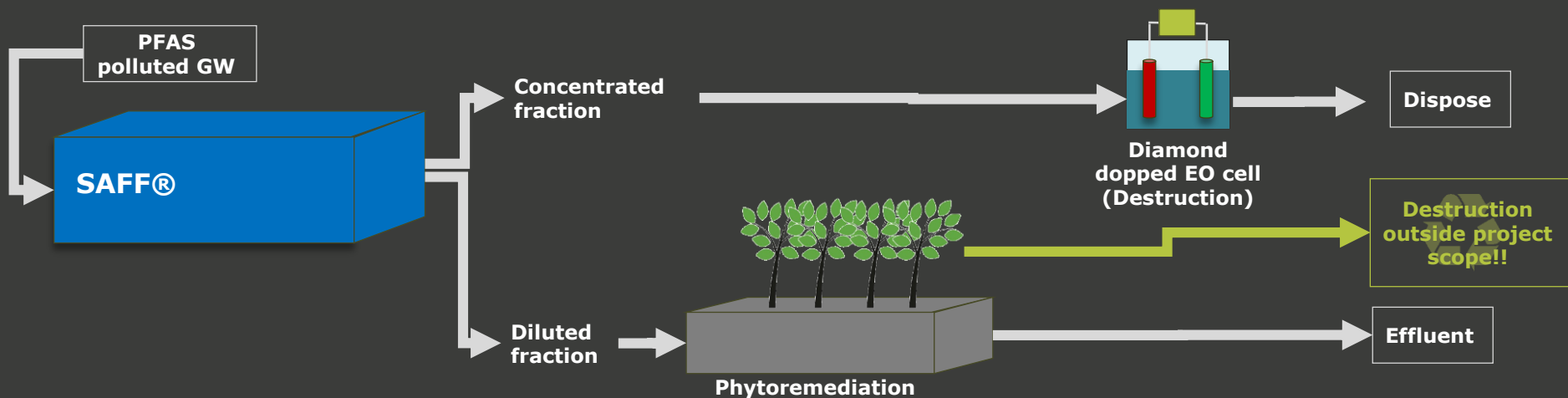


Diamond Doped electrodes Electrooxidation cell

Configuration Spanish site



Configuration Swedish site



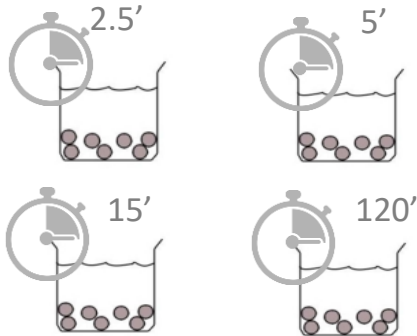
Bench scale tests with each technology

Treatment technology	Objective of bench scale test
SAFF	Checking the removal efficiency of short and long chain PFAS with each water matrix
AEX	<ul style="list-style-type: none">- Select from the three identified resins from Purolite (PFA694, A532E and A592EBF) the most suited for PFAs removal.- Estimate the adsorption capacity of the most suitable resin.- Select the most efficient regeneration solution for the selected resin.
EO	Optimization of electric consumption for treatment of regeneration solution
PHYTO	Testing of three different plant species and substrates for optimization of PFAS removal.

1. Reequilibrium rate & resin selection

- PFA694E
- A592EBF
- A532E
- GAC (for reference)

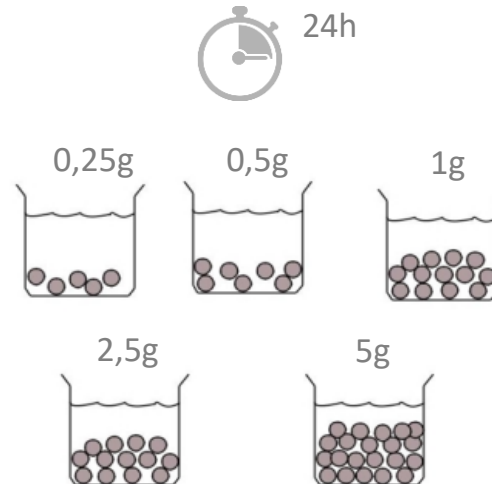
Spiked groundwater: 6:2FTS, PFPeA and PFBA



2. Adsorption capacity

- PFA694E

Spiked groundwater: 6:2FTS, PFPeA and PFBA

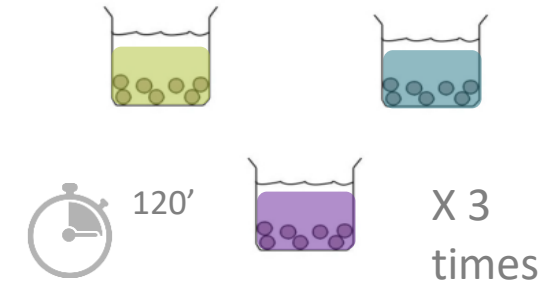


3. Regeneration strategy

PFA694E & spiked GW overnight

Resine with regeneration solutions:

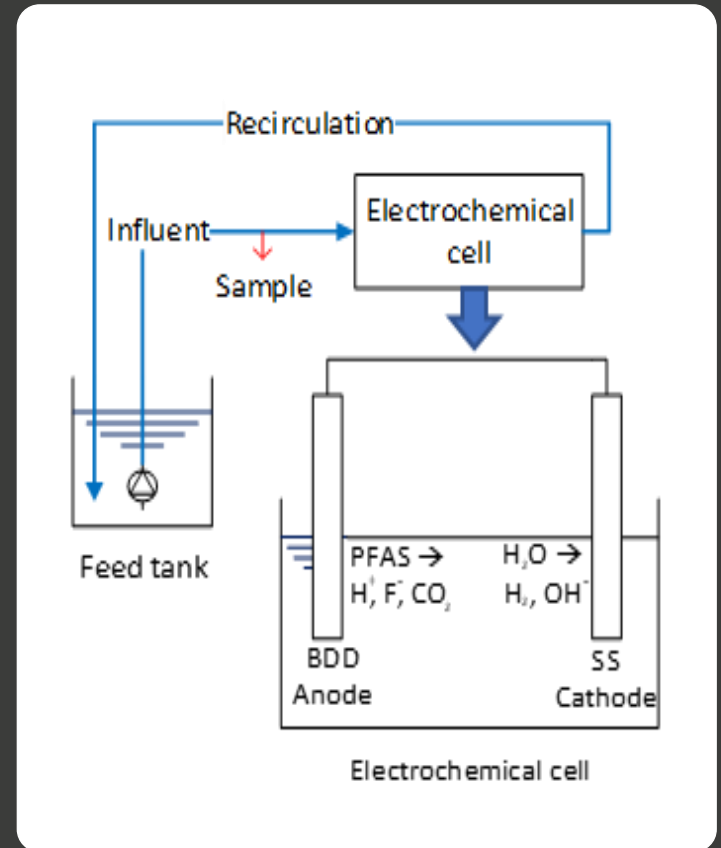
- 0.5%NH₄OH + 0.5%NH₄Cl
- 80%CH₃OH + 1%NH₄Cl
- 80%CH₃CH₂OH + 1%NH₄Cl



Bench scale test with Electrooxidation cell - Experimental set-up

Treatment of used regeneration solutions with
different intensities during 4h:

- 5A
- 15A
- 25A



Other technologies being tested

SAFF



PHYT
O





LIFE SOuRCE

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Thank you!
Tack!
¡Gracias!

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