WP7

WP leader: ENVYTECH SOLUTIONS AB

# Validation and Remediation

This project has received funding from the H2020 programme under Grant Agreement No. 101037509

Months: 1 – 40

2023/07/25 - Review meeting - Patras

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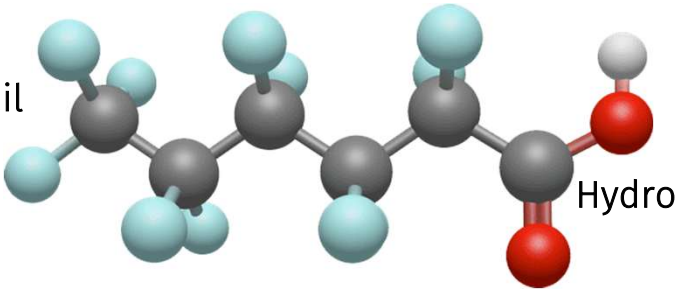
# Full scale SAFF20 pilot demonstration plant

SAFF - Surface Active Foam Fractionation technology, created by OPEC systems.

A sustainable treatment method for PFAS contaminated water, using only air and electricity

Robust treatment method not affected by other pollutants such as metals or organic substances, particles, pH, nutrients or other water chemistry.

SAFF uses the air bubbles physiochemistry in combination with the surface activeness of PFAS moecules to move them out of solution and into a removable foam

# Full scale SAFF20 pilot demonstration plant

SAFF Treatment process work in 2 or 3 steps depending on model.

SAFF20 offers 2 fractionation/concentration steps

SAFF40 offers 3 fractionation/concentration steps

Primary step: 10 x inital concentration
Secondary Step: 1500 x initial concentration
Tertiary Step: 500-200 x initial concentration

Other known PFAS fractionation technologies include the Ocean creating sea foam

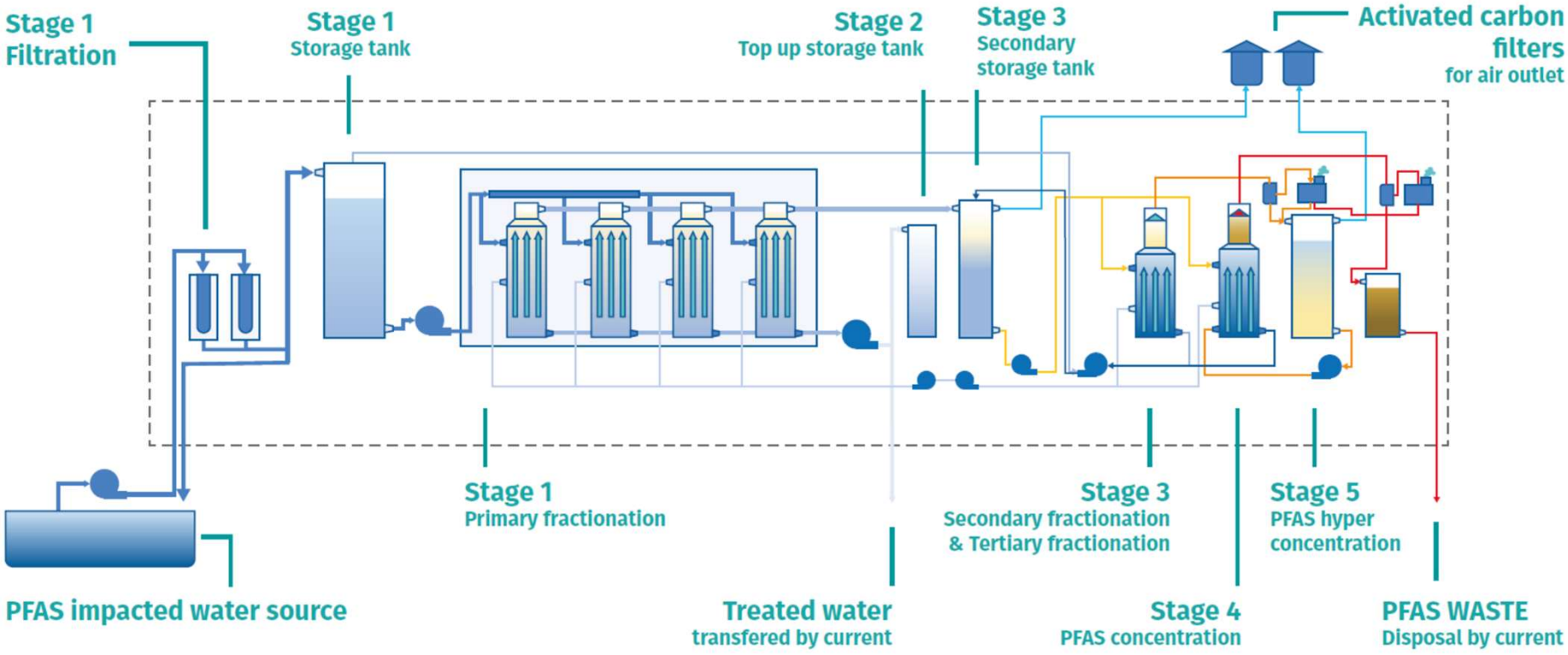
# Full scale SAFF20 pilot demonstration plant

## Removal efficiency of SAFF in different waters

| Substance | OPEC GW Australia 150 000 m³ | NSR Leachate 30 000 m³ | Telge Leachate 250 000 m³ | Löt Leachate 15 000 m³ | Mjölbo Leachate 9000 m³ | Swedish Airport 40 m³ | Fire Fighting water Refinery 12 000 m³ | EU LIFE SouRCe Groundwater | EU LIFE SouRCe Groundwater |
|---|---|---|---|---|---|---|---|---|---|
| PFDA | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 96% | Up to 99,9% |
| PFNA | 100% | 100% | 100% | 100% | 100% | 100% | 100% | Up to 99,9% | Up to 99,9% |
| 6:2 FTS | 100% | 100% | 100% | 100% | 100% | 100% | 99,5% | Up to 99,9% | Up to 99,9% |
| PFOA | 100% | 100% | 100% | 100% | 99% | 98% | 99% | ND | Up to 99,9% |
| PFOS | 100% | 99% | 98% | 100% | 100% | 100% | 100% | 84% | 98% |
| PFHxS | 97% | 100% | 100% | 99% | 99% | 79% | 99,5% | 51% | 99% |
| PFHpA | 67% | 99% | 98% | 90% | 92% | 99% | 95% | 93% | Up to 99,9% |
| PFHxA | 20% | 54% | 29% | 35% | 10% | 0% | 35% | 42% | 99% |
| PFPeA | 24% | 0% | 3% | 38% | 7% | 0% | 0% | 4% | 98% |
| PFBA | 21% | 8% | 1% | 0% | 0% | 0% | 0% | 76% | 99% |
| PFBS | 22% | 43% | 10% | 19% | 8% | 0% | 52% | ND | Up to 99,9% |
| Total PFAS conc. | 4000 ng/l | 6000 ng/l | 4000 ng/l | 15 000 ng/l | 4000 ng/l | 4000 ng/l | 100 000 ng/l | 100 000 ng/l | 2 000 000 ng/l |

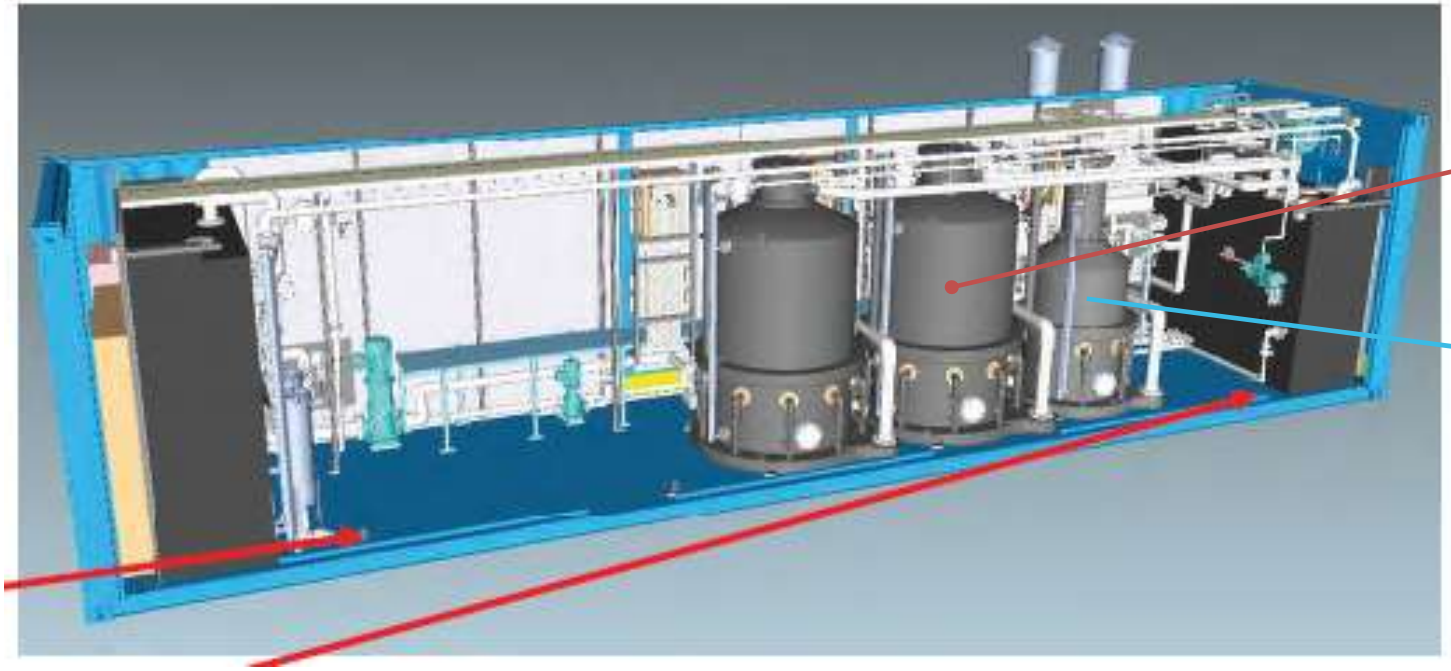
# Full scale SAFF20 pilot demonstration plant

## EPOC Envytech 40’ containerised SAFF System



# Full scale SAFF20 pilot demonstration plant

## EPOC Envytech 20’ containerised SAFF System H2020



1 Primary Fractination

2 Secondary Fractination

# Full scale treatment and Hybrid Remediation

Installlation of SAFF20 pilot plant at Korsör site, Denmark (oktober 2023 sep 2024) for treatment of groundwater.

Treatment of contaminated groundwater at Korsör site using SAFF technology. Combination of SAFF and cold plama destruction pilot plant for destruction of PFAS concentrate (waste from SAFF)

Trials for destruction of PFAS concentrate using other possible technologies such as Electrochemical oxidation and Super Critical Water Oxidation

Desk top study followed by lab scale and full scale trial of amendments for increased PFAS removal rates for short chain PFAS using SAFF on highly contaminated PFAS ground and surface water

Installation of SAFF20 pilot plant at Cassa site in Spain

Desk top study followed by lab scale and full scale trial of amendments for increased PFAS removal rates for short chain PFAS using SAFF for low contaminated groundwater


# Korsør – Bench scale testing results

Results in miniSAFF show minimum of 99% removal of PFAS including PFOS, PFOA, 6:2 FTS and PFHpS. Same efficiency is expected for PFOSA, PFNA & PFDA

PFHxS removal efficiency of 95 % is expected to be higher in full scale.

Lower removal efficiency – as expected for short chain PFAS.

MiniSAFF is known to be 10-15% mor efficient in full-scale, Low foamy water

| Sampling day | | MiniSAFF, 2023-10-16 | | |
|---|---|---|---|---|
| Sample number | | 177-2023-10171299 | 177-2023-10171298 | |
| Sample namn | | Untreated | Treated | |
| Komponent | Unit | | | Removal rate (Treated - Untreated) |
| PFBA (Perfluorobutanoic acid) | ng/l | 5600 | 5600 | 0% |
| PFBS (Perfluorobutanesulfonic acid) | ng/l | 21000 | 20000 | 5% |
| PFPeA (Perfluoropentanoic acid) | ng/l | 9000 | 9300 | 0% |
| PFPeS (Perfluoropentanesulfonic acid) | ng/l | 19000 | 12000 | 37% |
| PFHxA (Perfluorohexanoic acid) | ng/l | 27000 | 24000 | 11% |
| | | | | |
| PFHxS (Perfluorohexanesulfonic acid) | ng/l | 18000 | 1100 | 94% |
| PFHpA (Perfluoroheptanoic acid) | ng/l | 3800 | 1100 | 71% |
| PFHpS (Perfluoroheptanesulfonic acid) | ng/l | 100 | <10 | up to 99,9% |
| PFOA (Perfluorooctanoic acid) | ng/l | 1700 | 19 | 99% |
| PFOS (Perfluorooctane sulfonic acid) | ng/l | 190 | <10 | up to 99,9% |
| 6:2 FTS (Fluorotelomer sulfonate) | ng/l | 26 | <10 | up to 99,9% |
| Sum of PFOA, PFOS, PFNA and PFHxS | ng/l | 20000 | 1100 | 95% |
| Sum of 20 PFAS | ng/l | 110000 | 73000 | 34% |
| Sum of 22 PFAS | ng/l | | | |
| | | | | |
| PFOSA (Perfluorooctanesulfonamide) | ng/l | <10 | <10 | ND |
| PFNA (Perfluorononanoic acid) | ng/l | <10 | <10 | ND |
| PFNS (Perfluorononanesulfonic acid) | ng/l | <10 | <10 | ND |
| PFDA (Perfluorodecanoic acid) | ng/l | <10 | <10 | ND |
| PFDS (Perfluorodecanesulfonic acid) | ng/l | <10 | <10 | ND |
| PFUnDA (Perfluoroundecanoic acid) | ng/l | <10 | <10 | ND |
| PFUnDS (Perfluoroundecanesulphonic acid) | ng/l | <10 | <10 | ND |
| PFDoDA (Perfluorododecanoic acid) | ng/l | <10 | <10 | ND |
| PFDoDS (Perfluorododecane sulfonic acid) | ng/l | <10 | <10 | ND |
| PFTrDA (Perfluorotridecanoic acid) | ng/l | <10 | <10 | ND |
| PFTrDS (Perfluorotridecane sulfonic acid) | ng/l | <10 | <10 | ND |
| | | | | TOPA should be performed as we see precursors adding |

# Korsør – Full scale SAFF20 results

| Sampling day | | Batch, 2023-12-21 | | | 2024-03-15 | | | 2024-05-08 | | | 2024-06-19 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample number | | 835-2023-81335211 | 835-2023-81335212 | | 177-2024-03210090 | 177-2024-03210091 | | 177-2024-05090049 | 177-2024-05090050 | | 177-2024-06252134 | 177-2024-06252135 | |
| Sample namn | | IN | OUT | | In_15/3 | Out_15/3 | | IN(Test 1) | UT(Test 1) | | IN_19/6 | OUT_19/6 | |
| Komponent | Unit | Results | Results | Removal rate (OUT-IN) | Results | Results | Removal rate (OUT-IN) | Results | Results | Removal rate (OUT-IN) | Results | Results | Removal rate (OUT-IN) |
| PFBA (Perfluorobutanoic acid) | ng/l | 840 | 710 | 15% | 1400 | 1400 | 0% | 1500 | 1500 | 0% | 1200 | 1100 | 8% |
| PFBS (Perfluorobutanesulfonic acid) | ng/l | 4900 | 3500 | 29% | 7600 | 6800 | 11% | 8000 | 7800 | 3% | 5900 | 5400 | 8% |
| PFPeA (Perfluoropentanoic acid) | ng/l | 1400 | 1200 | 14% | 2100 | 2100 | 0% | 2200 | 2300 | -5% | 1900 | 2000 | -5% |
| PFPeS (Perfluoropentanesulfonic acid) | ng/l | 2900 | 490 | 83% | 24000 | 4200 | 83% | 5600 | 2500 | 55% | 4500 | 1700 | 62% |
| PFHxA (Perfluorohexanoic acid) | ng/l | 4800 | 3100 | 35% | 13000 | 8100 | 38% | 8500 | 7400 | 13% | 6200 | 4900 | 21% |
| | | | | | | | | | | | | | |
| PFHxS (Perfluorohexanesulfonic acid) | ng/l | 10000 | 25 | 99,8% | 13000 | 370 | 97% | 23000 | 290 | 99% | 18000 | 310 | 98% |
| PFHpA (Perfluoroheptanoic acid) | ng/l | 830 | 14 | 98,3% | 1500 | 70 | 95% | 1200 | 97 | 92% | 970 | 75 | 92% |
| PFHpS (Perfluoroheptanesulfonic acid) | ng/l | 280 | <10 | up to 99,9% | 280 | <10 | up to 99,9% | 500 | <10 | up to 99,9% | 370 | <10 | up to 99,9% |
| PFOA (Perfluorooctanoic acid) | ng/l | 1100 | <10 | up to 99,9% | 940 | 18 | 98% | 1600 | 18 | 99% | 1200 | 23 | 98% |
| PFOS (Perfluorooctane sulfonic acid) | ng/l | 2100 | <10 | up to 99,9% | 2000 | 16 | 99% | 3300 | 29 | 99% | 3300 | 34 | 99% |
| 6:2 FTS (Fluorotelomer sulfonate) | ng/l | 400 | <10 | up to 99,9% | 250 | <10 | up to 99,9% | 380 | <10 | up to 99,9% | 550 | <10 | up to 99,9% |
| Sum of PFOA, PFOS, PFNA and PFHxS | ng/l | 13000 | 25 | 99,8% | 16000 | 400 | 98% | 28000 | 340 | 99% | 23000 | 370 | 98% |
| Sum of 20 PFAS | ng/l | | | | 66000 | 23000 | 65% | 55000 | 22000 | 60% | 44000 | 16000 | 64% |
| Sum of 22 PFAS | ng/l | 30000 | 9000 | 70,0% | | | | | | | | | |
| | | | | | | | | | | | | | |
| PFOSA (Perfluorooctanesulfonamide) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFNA (Perfluorononanoic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFNS (Perfluorononanesulfonic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFDA (Perfluorodecanoic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFDS (Perfluorodecanesulfonic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFUnDA (Perfluoroundecanoic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFUnDS (Perfluoroundecanesulphonic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFDoDA (Perfluorododecanoic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFDoDS (Perfluorododecane sulfonic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFTrDA (Perfluorotridecanoic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| PFTrDS (Perfluorotridecane sulfonic acid) | ng/l | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND | <10 | <10 | ND |
| Comment | | | | | | | | | | | | | |

# Korsør – Bench scale testing

**Performance of lab scale trial using water from the site – with additive**

The second trial was done with two different additives (CTAB and Allonia booster 1).

One dosage used in the trial with CTAB comprised a dose of 4 mg/l.

For the Allonnia Booster, three different dosages were trialed, 2 mg/l, 6 mg/l and 10 mg/l.

# Korsør – Bench scale testing results

| Sampling day | | MiniSaff, 2024-03-14 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample number | | 177-2024-03180352 | 177-2024-03180353 | 177-2024-03180354 | 177-2024-03180355 | 177-2024-03180356 | 177-2024-03180357 | 177-2024-03180358 | 177-2024-03180359 | | 177-2024-03180360 | 177-2024-03180361 |
| Sample namn | | Korsör UT_1 | Korsör IN_1 | Korsör UT_2_2mg/l | Korsör IN_2 | Korsör UT_3_6mg/l | Korsör IN_3 | Korsör UT_4_10mg/l | Korsör IN_4 | | Korsör UT_5_4mg/l | Korsör IN_5 |
| Komponent | Unit | Results | Results | Results | Results | Results | Results | Results | Results | Removal rate (OUT-IN) | | |
| PFBA (Perfluorobutanoic acid) | ng/l | 820 | 810 | 820 | 840 | 630 | 890 | 500 | 840 | 40% | 690 | 900 |
| PFBS (Perfluorobutanesulfonic acid) | ng/l | 4100 | 4500 | 57 | 5000 | 5,2 | 4900 | 2,4 | 4200 | up to 99,9% | 10 | 4100 |
| PFPeA (Perfluoropentanoic acid) | ng/l | 1400 | 1500 | 490 | 1600 | 120 | 1500 | 42 | 1500 | 97% | 270 | 1500 |
| PFPeS (Perfluoropentanesulfonic acid) | ng/l | 1300 | 3100 | 3,3 | 3300 | 3,4 | 3200 | 3,4 | 2600 | up to 99,9% | 1 | 2800 |
| PFHxA (Perfluorohexanoic acid) | ng/l | 3300 | 4100 | 19 | 3900 | 2,7 | 3800 | 1,2 | 3600 | up to 99,9% | 4,5 | 4400 |
| | | | | | | | | | | | | |
| PFHxS (Perfluorohexanesulfonic acid) | ng/l | 230 | 11000 | 5,6 | 11000 | 23 | 9500 | 31 | 10000 | up to 99,9% | 8,7 | 9500 |
| PFHpA (Perfluoroheptanoic acid) | ng/l | 94 | 670 | <0,30 | 650 | <0,30 | 650 | <0,30 | 620 | up to 99,9% | <0,30 | 670 |
| PFHpS (Perfluoroheptanesulfonic acid) | ng/l | <10 | 280 | <0,30 | 290 | 1,5 | 210 | 2,6 | 280 | 99% | 0,91 | 240 |
| PFOA (Perfluorooctanoic acid) | ng/l | <10 | 720 | <0,30 | 780 | 0,43 | 710 | 0,47 | 820 | up to 99,9% | <0,30 | 730 |
| PFOS (Perfluorooctane sulfonic acid) | ng/l | <10 | 2100 | 3,9 | 2600 | 31 | 2100 | 33 | 1800 | 98% | 24 | 1900 |
| 6:2 FTS (Fluorotelomer sulfonate) | ng/l | <10 | 300 | <0,30 | 330 | <0,30 | 330 | <0,30 | 290 | up to 99,9% | <0,30 | 290 |
| Sum of PFOA, PFOS, PFNA and PFHxS | ng/l | 230 | 14000 | 9,5 | 14000 | 54 | 12000 | 64 | 13000 | up to 99,9% | 33 | 12000 |
| Sum of 20 PFAS | ng/l | 11000 | 29000 | 1400 | 30000 | 820 | 27000 | 620 | 26000 | 98% | 1000 | 27000 |
| Sum of 22 PFAS | ng/l | | | | | | | | | | | |
| | | | | | | | | | | | | |
| PFOSA (Perfluorooctanesulfonamide) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFNA (Perfluorononanoic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFNS (Perfluorononanesulfonic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFDA (Perfluorodecanoic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFDS (Perfluorodecanesulfonic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFUnDA (Perfluoroundecanoic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFUnDS (Perfluoroundecanesulphonic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFDoDA (Perfluorododecanoic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |
| PFDoDS (Perfluorododecane sulfonic acid) | ng/l | <10 | <10 | <1,0 | <10 | <1,0 | <10 | <1,0 | <10 | ND | <1,0 | <10 |
| PFTrDA (Perfluorotridecanoic acid) | ng/l | <10 | <10 | <1,0 | <10 | <1,0 | <10 | <1,0 | <10 | ND | <1,0 | <10 |
| PFTrDS (Perfluorotridecane sulfonic acid) | ng/l | <10 | <10 | <0,30 | <10 | <0,30 | <10 | <0,30 | <10 | ND | <0,30 | <10 |

# Korsør – Bench scale testing results

Enhanced removal when using SAFF with Allonia booster

PFBA: 0% → 40%
PFBS: 5% → 99,9%
PFPeA: 0% → 97%
PFPeS: 37% → 99,9%
PFHxA: 11% → 99,9%

Sum of 20 PFAS 34% → 98%

| Sampling day | | MiniSAFF, 2023-10-16 | | | MiniSAFF, 2024-03-14 | | |
|---|---|---|---|---|---|---|---|
| Sample number | | 177-2023-10171299 | 177-2023-10171298 | | 177-2024-03180359 | 177-2024-03180358 | |
| Sample namn | | Untreated | Treated | | Korsör IN_4 | Korsör UT_4_10mg/l | |
| Komponent | Unit | | | Removal rate (Treated - Untreated) | Results | Results | Removal rate (OUT-IN) |
| PFBA (Perfluorobutanoic acid) | ng/l | 5600 | 5600 | 0% | 840 | 500 | 40% |
| PFBS (Perfluorobutanesulfonic acid) | ng/l | 21000 | 20000 | 5% | 4200 | 2,4 | up to 99,9% |
| PFPeA (Perfluoropentanoic acid) | ng/l | 9000 | 9300 | 0% | 1500 | 42 | 97% |
| PFPeS (Perfluoropentanesulfonic acid) | ng/l | 19000 | 12000 | 37% | 2600 | 3,4 | up to 99,9% |
| PFHxA (Perfluorohexanoic acid) | ng/l | 27000 | 24000 | 11% | 3600 | 1,2 | up to 99,9% |
| | | | | | | | |
| PFHxS (Perfluorohexanesulfonic acid) | ng/l | 18000 | 1100 | 94% | 10000 | 31 | up to 99,9% |
| PFHpA (Perfluoroheptanoic acid) | ng/l | 3800 | 1100 | 71% | 620 | <0,30 | up to 99,9% |
| PFHpS (Perfluoroheptanesulfonic acid) | ng/l | 100 | <10 | up to 99,9% | 280 | 2,6 | 99% |
| PFOA (Perfluorooctanoic acid) | ng/l | 1700 | 19 | 99% | 820 | 0,47 | up to 99,9% |
| PFOS (Perfluorooctane sulfonic acid) | ng/l | 190 | <10 | up to 99,9% | 1800 | 33 | 98% |
| 6:2 FTS (Fluorotelomer sulfonate) | ng/l | 26 | <10 | up to 99,9% | 290 | <0,30 | up to 99,9% |
| Sum of PFOA, PFOS, PFNA and PFHxS | ng/l | 20000 | 1100 | 95% | 13000 | 64 | up to 99,9% |
| Sum of 20 PFAS | ng/l | 110000 | 73000 | 34% | 26000 | 620 | 98% |
| Sum of 22 PFAS | ng/l | | | | | | |
| | | | | | | | |
| PFOSA (Perfluorooctanesulfonamide) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFNA (Perfluorononanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFNS (Perfluorononanesulfonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDA (Perfluorodecanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDS (Perfluorodecanesulfonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFUnDA (Perfluoroundecanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFUnDS (Perfluoroundecanesulphonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDoDA (Perfluorododecanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDoDS (Perfluorododecane sulfonic acid) | ng/l | <10 | <10 | ND | <10 | <1,0 | ND |
| PFTrDA (Perfluorotridecanoic acid) | ng/l | <10 | <10 | ND | <10 | <1,0 | ND |
| PFTrDS (Perfluorotridecane sulfonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |

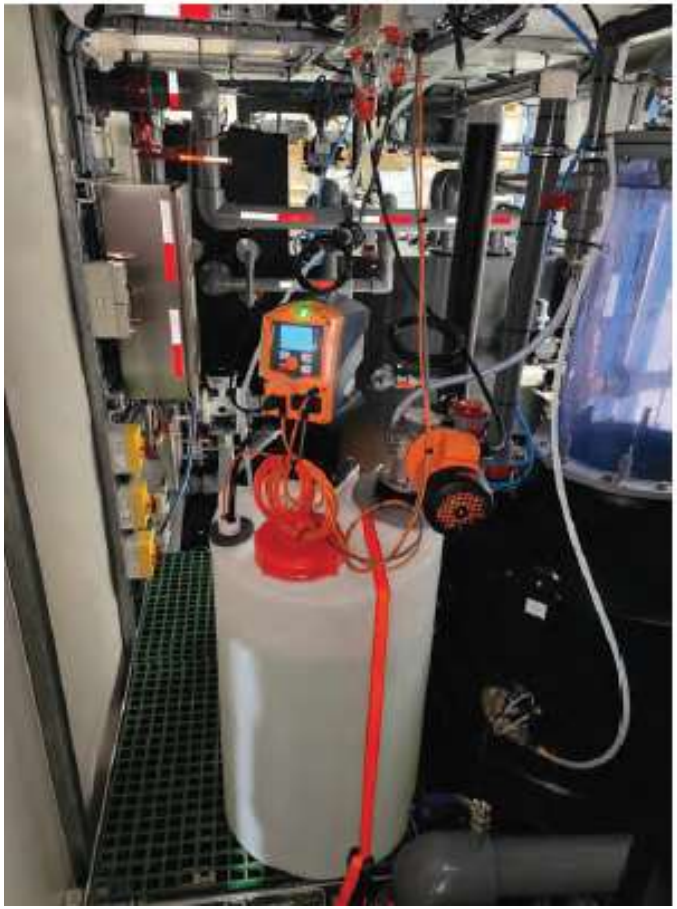
# Korsør – Bench scale testing results

***Full scale project using additives from Allonnia "Booster".***

All Full-scale SAFF units are equipped with a Chemical dosing tank and pump system

Possibility to add of solvents / additives or other type of amendments to increase efficiency of the foam fractionation process

Injection is performed straight into the Foam Fractionation process, no extra treatment steps or treatment system needed.



# Korsør – Full scale SAFF20 results with additive

Results from full scale treatment shows enhanced removal of both long- and short-chains PFAS.

Sum of 20 PFAS removal increased from 61% to 94 % due to primary increased reduction of short chain-PFAS.

Still troubles with the removal of PFBA and PFPeA.

| Sampling day | | 2024-08-28 | | | | | |
|---|---|---|---|---|---|---|---|
| Sample number | | 177-2024-08300080 | 177-2024-08300079 | | 177-2024-08300078 | 177-2024-08300077 | |
| Sample namn | | IN 1 | UT 1 | | IN 5mg/l | UT 5mg/l | |
| Komponent | Unit | Results | Results | Removal rate (UT 1-IN 1) | Results | Results | Removal rate (UT 1-IN 1) |
| PFBA (Perfluorobutanoic acid) | ng/l | 490 | 520 | -6% | 480 | 570 | -19% |
| PFBS (Perfluorobutanesulfonic acid) | ng/l | 2300 | 2300 | 0% | 2300 | 130 | 94% |
| PFPeA (Perfluoropentanoic acid) | ng/l | 1100 | 1200 | -9% | 1200 | 330 | 73% |
| PFPeS (Perfluoropentanesulfonic acid) | ng/l | 1900 | 1500 | 21% | 1800 | 58 | 97% |
| PFHxA (Perfluorohexanoic acid) | ng/l | 2700 | 2500 | 7% | 2600 | 170 | 93% |
| | | | | | | | |
| PFHxS (Perfluorohexanesulfonic acid) | ng/l | 8800 | 750 | 91% | 8800 | 37 | up to 99,9% |
| PFHpA (Perfluoroheptanoic acid) | ng/l | 510 | 150 | 71% | 500 | 5,9 | 99% |
| PFHpS (Perfluoroheptanesulfonic acid) | ng/l | 370 | <10 | up to 99,9% | 330 | 1,7 | 99% |
| PFOA (Perfluorooctanoic acid) | ng/l | 780 | 29 | 96% | 730 | 5 | 99% |
| PFOS (Perfluorooctane sulfonic acid) | ng/l | 4200 | 73 | 98% | 4100 | 21 | 99% |
| 6:2 FTS (Fluorotelomer sulfonate) | ng/l | 870 | 34 | 96% | 810 | 5,2 | 99% |
| Sum of PFOA, PFOS, PFNA and PFHxS | ng/l | 14000 | 850 | 94% | 14000 | 63 | up to 99,9% |
| Sum of 20 PFAS | ng/l | 23000 | 9000 | 61% | 23000 | 1300 | 94% |
| Sum of 22 PFAS | ng/l | | | | | | |
| | | | | | | | |
| PFOSA (Perfluorooctanesulfonamide) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFNA (Perfluorononanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFNS (Perfluorononanesulfonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDA (Perfluorodecanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDS (Perfluorodecanesulfonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFUnDA (Perfluoroundecanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFUnDS (Perfluoroundecanesulphonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDoDA (Perfluorododecanoic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |
| PFDoDS (Perfluorododecane sulfonic acid) | ng/l | <10 | <10 | ND | <10 | <1,0 | ND |
| PFTrDA (Perfluorotridecanoic acid) | ng/l | <10 | <10 | ND | <10 | <1,0 | ND |
| PFTrDS (Perfluorotridecane sulfonic acid) | ng/l | <10 | <10 | ND | <10 | <0,30 | ND |