

PFAS

PER- AND POLY-FLUOROALKYL SUBSTANCES

Formation :
Colloque reconnu
par le SPW ARNE

 Wallonie
environnement
SPW

5th International Congress

Management of Environmental & Health Risks

June 17, 18, 19 & 20, 2025 – Paris

Sustainable Removal of PFAS at high and complex Contamination Levels

Jurgen BUHL, Cornelsen Group, 0049 173 2585481, buhl@cornelsen.group

Topics

- PFAS in Rinse Water (FF Water)
- PFAS in Leachate Water (or RO)
- Alternative Approach
- Results of Application
- Conclusions



Fire-fighting Water

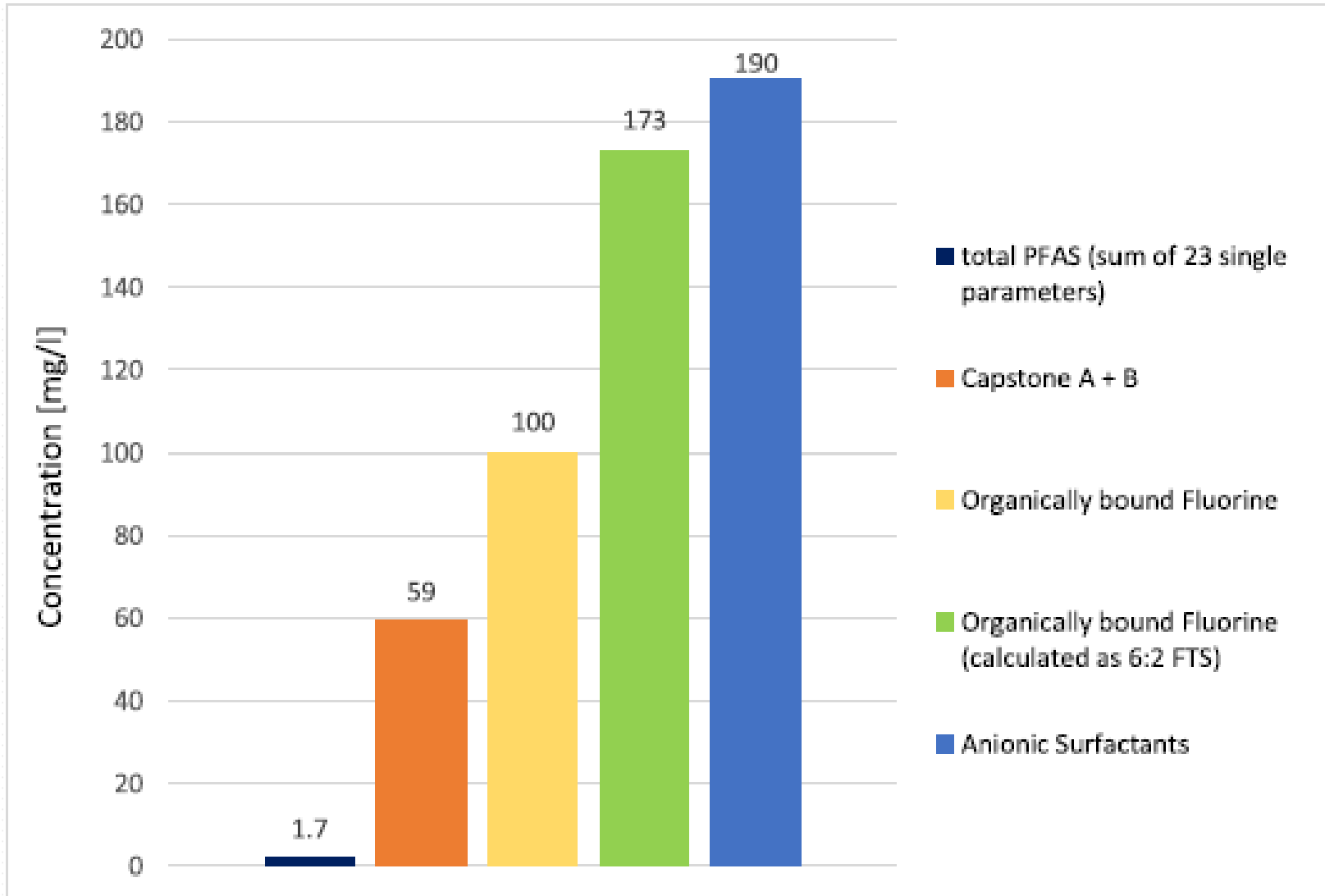


**Fire simulated -
Crude oil & Moussol**

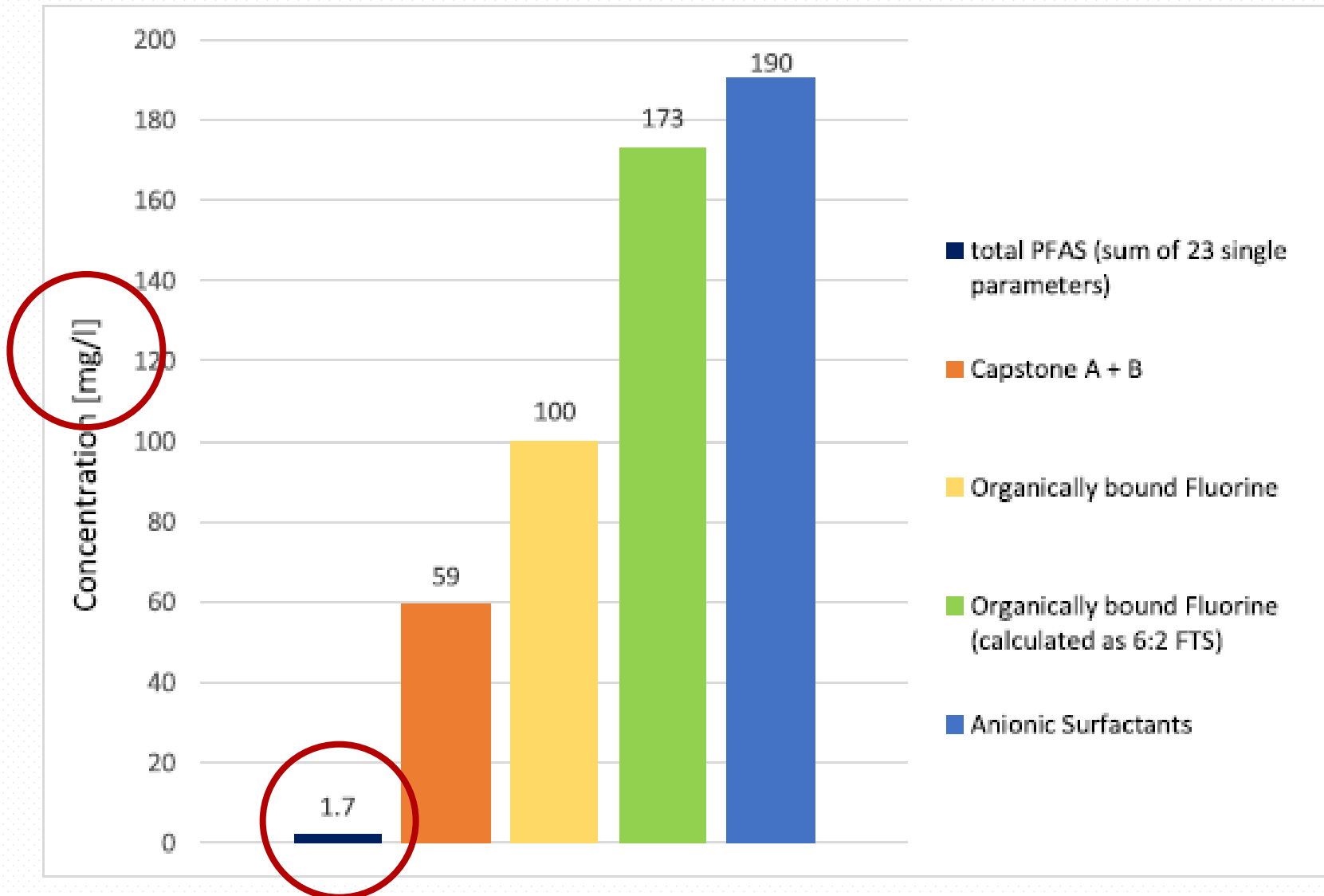
**Sample of FF-water -
PFAS + more**



Fire-fighting Water



Fire-fighting Water



Landfill Leachate Water

- Guardian (UK) in Nov 2024
 - one of main sources for PFAS
 - treatment plant boost concentrations
 - or created from precursors
- WastDive in June 2024
 - PFAS complicate treatment
 - Stricter limits (waste)

OCCURRENCE, FATE, AND TRANSPORT OF AQUATIC AND
TERRESTRIAL CONTAMINANTS | May 20, 2025

**National Assessment of PFAS in Landfill
Leachate in China: Non-Negligible
Ultrashort-Chain Components and
Socioeconomic Impacts**

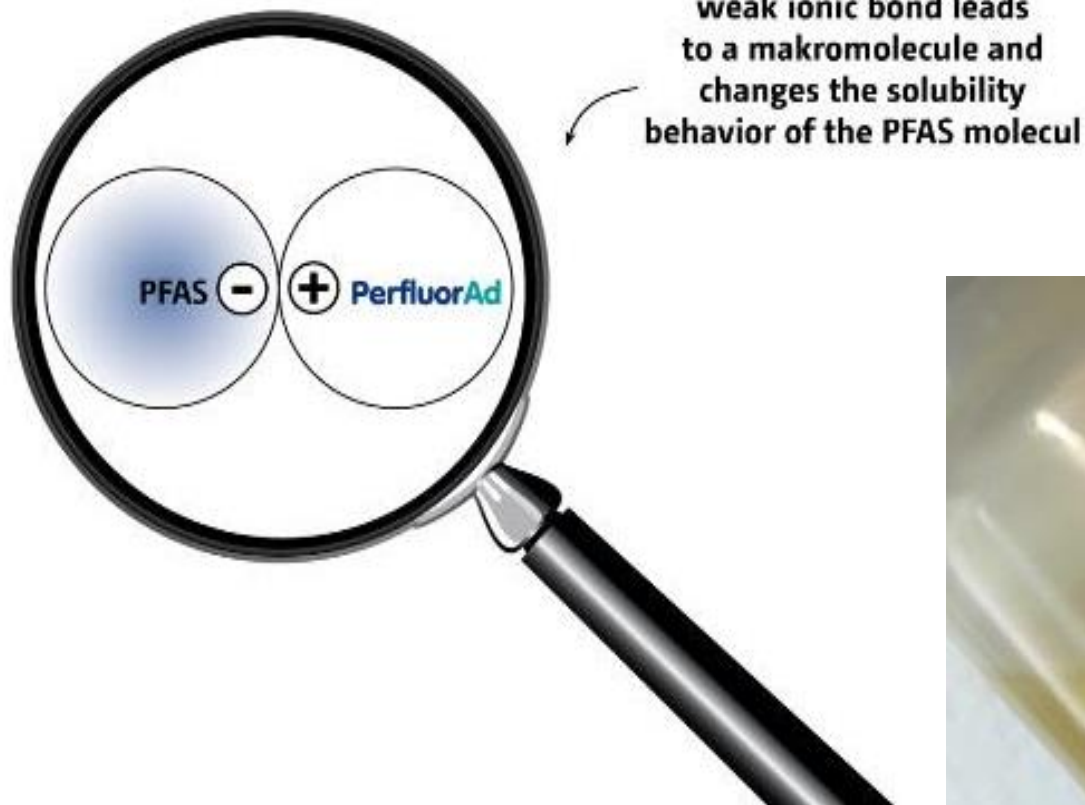
Tianyu Chen, Xiao-song He, Qiurui Zhang, Anen He, Chao Liu, Yue Sun, Si Wei,
Ruqing Chen, Lingxiangyu Li, Juan Li*, Jitao Lv*, Xianwei Wang, Yawei Wang,
and Guibin Jiang

Source:
ACS Publications

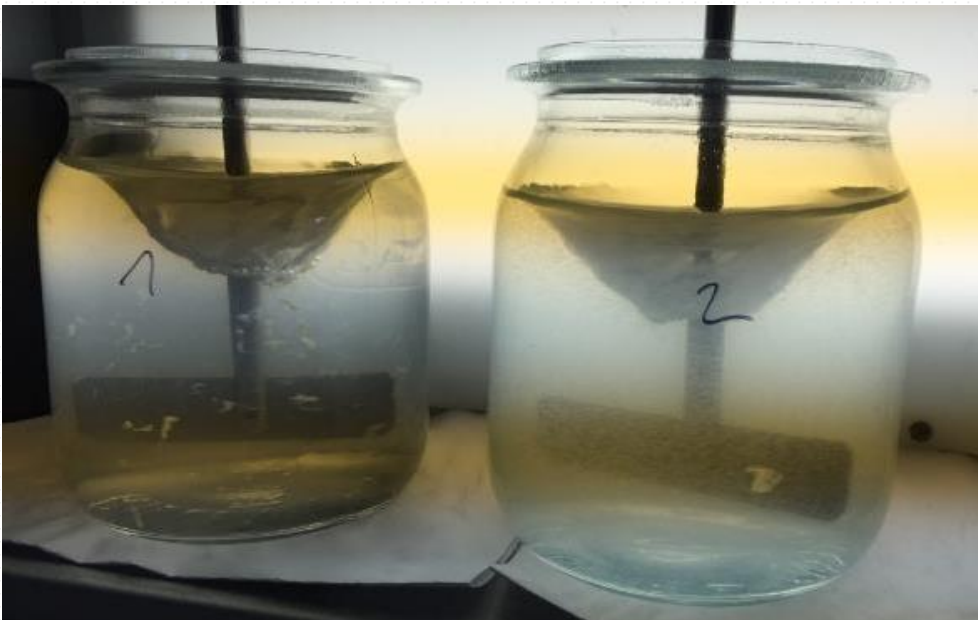
Landfill Leachate Water

- Landfill in Germany (NRW)
 - 134 ppm TOC
 - 2.630 ppm Na
 - 3.790 ppm Cl
 - 4,4 ppb PFAS
 - Water dark
- Treatment challenging
 - PFAS vs TOC on GAC
 - Alternative treatment solution?

Alternative - How it works

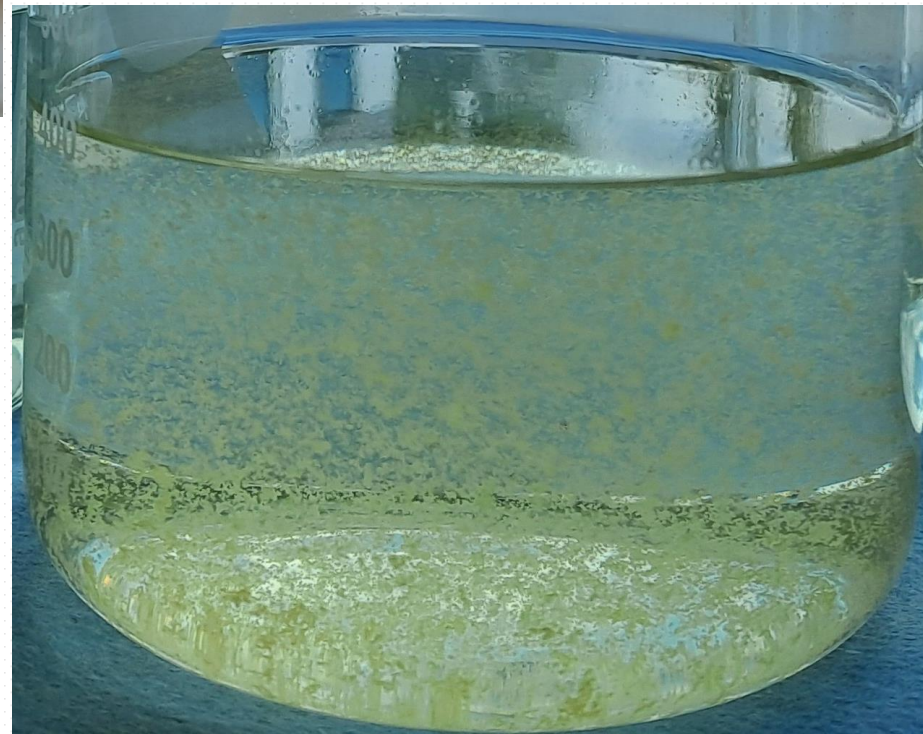


Alternative – How it works



**Formation of flocs
after 7 minutes**

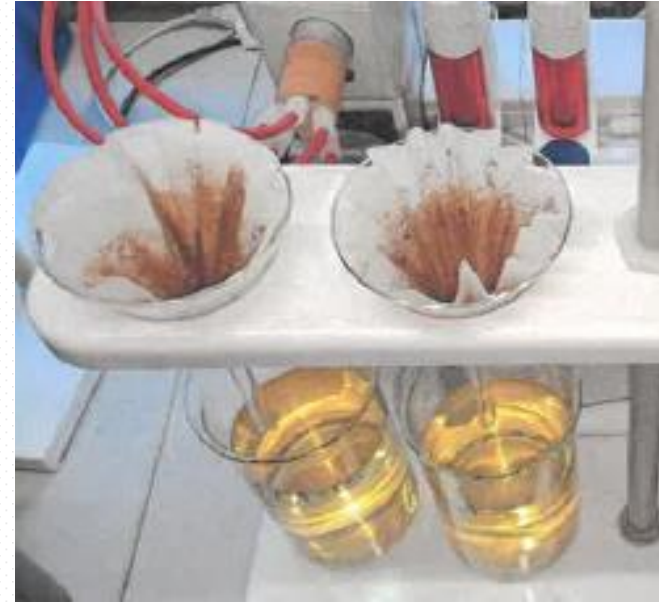
**PerfluorAd added to
PFAS water**



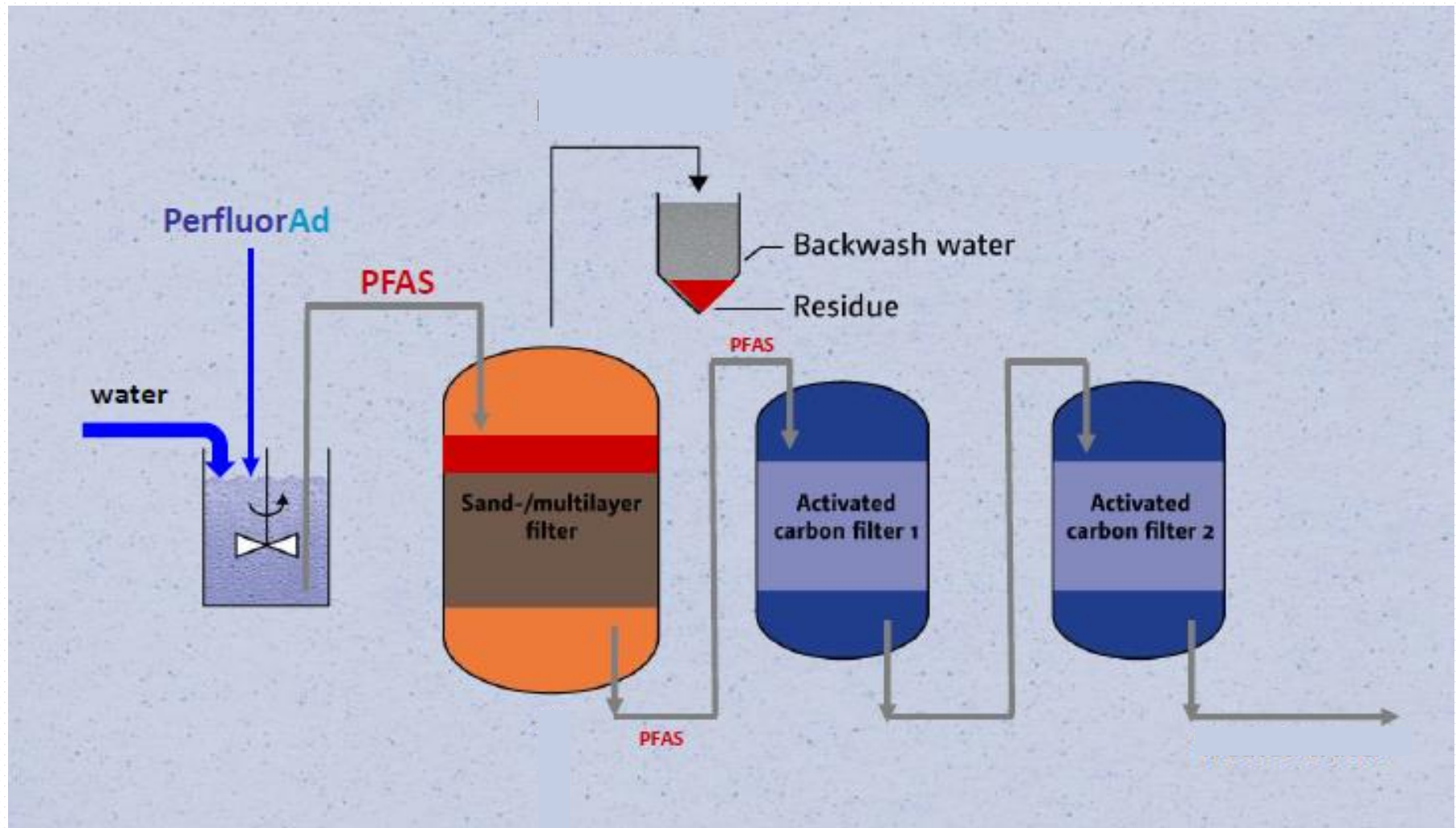
PerfluorAd – How it works

- after short duration
- Formation of flocs
- contain PFAS
- filtration removes PFAS
- simplifies treatment

Residues on filter contain
between **85 and 99%** of the PFAS



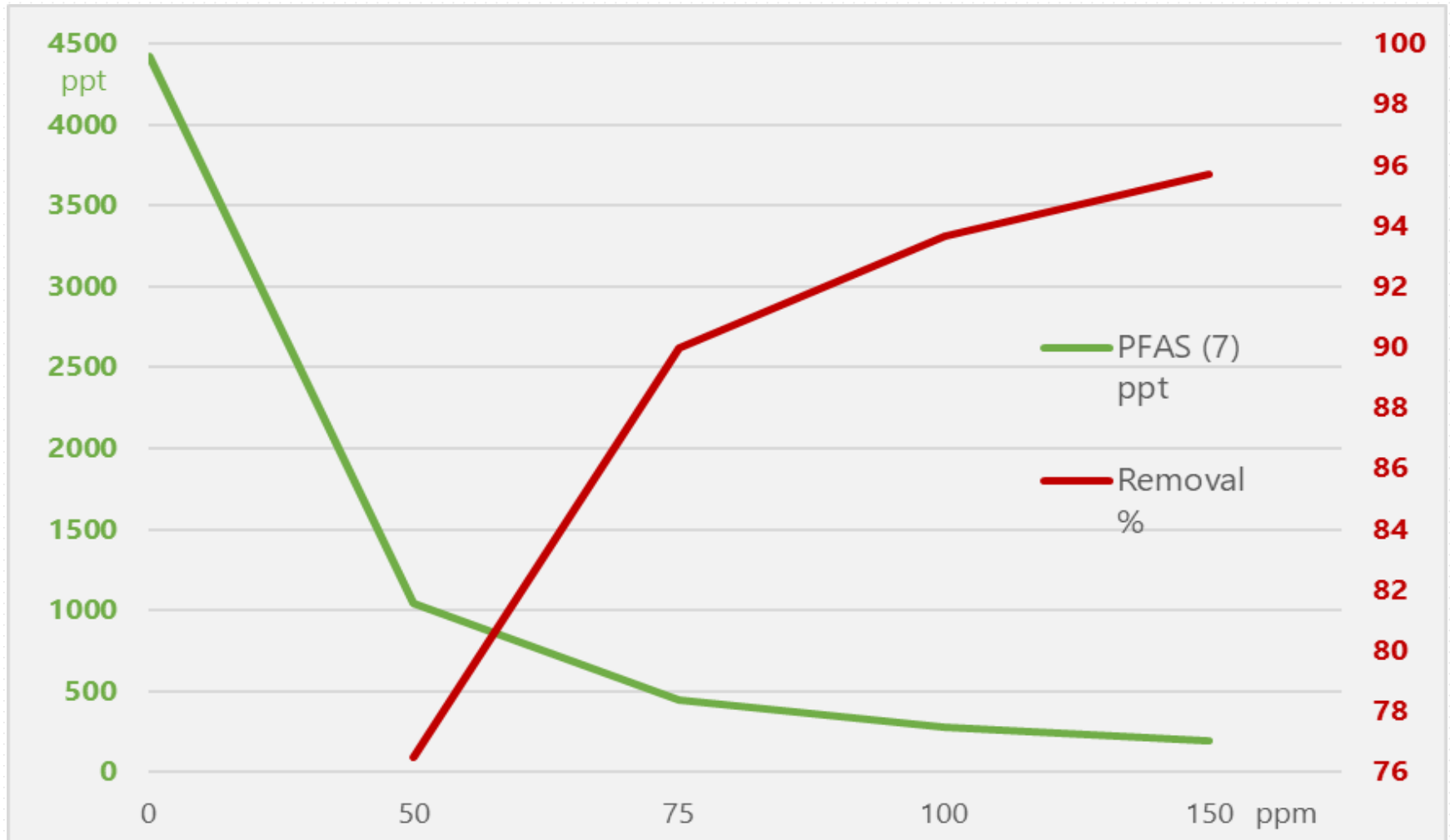
Treatment Scenario



Possible Applications?

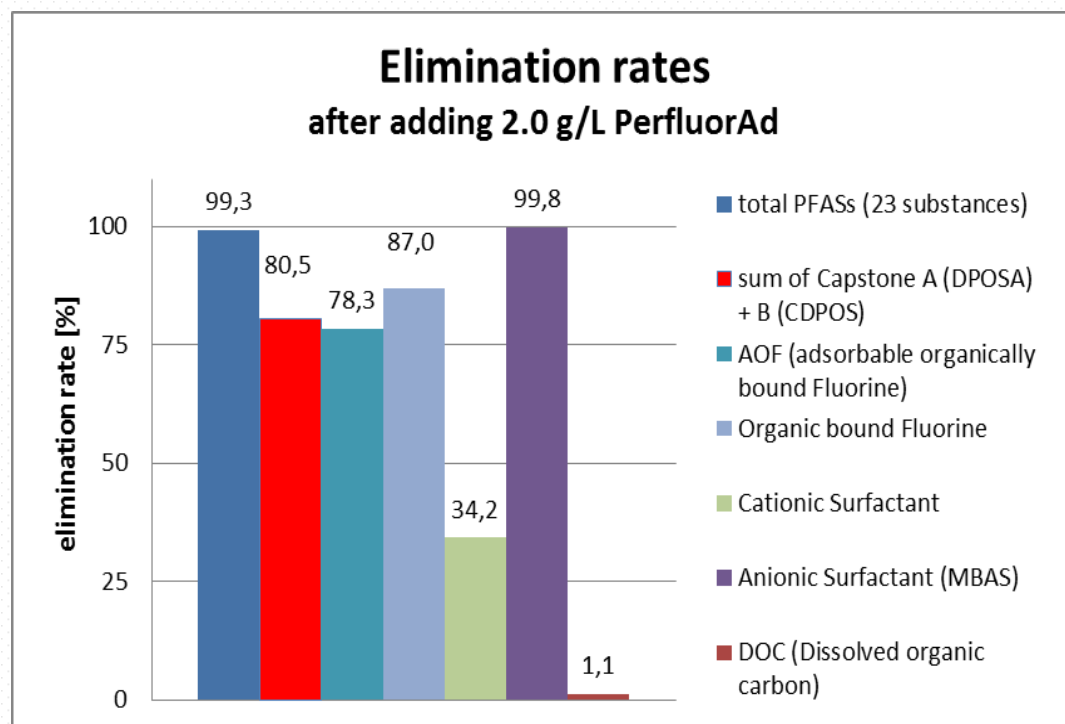
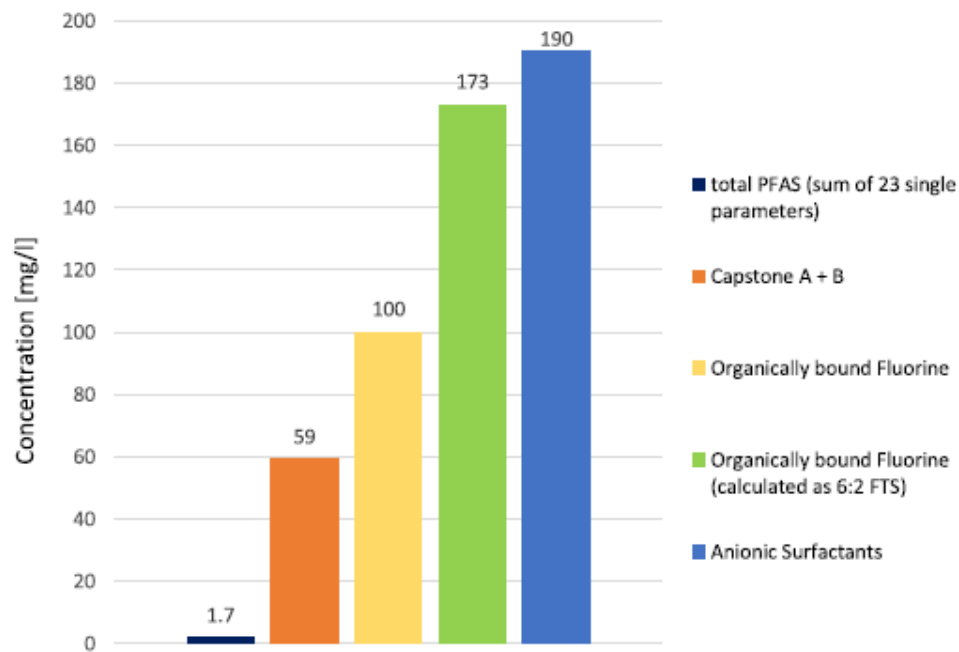
- concentrate from RO
- landfill leachate water
- industrial waste water
- fire-fighting water
- decontamination of FF trucks or systems
- ...

Results – Leachate Water

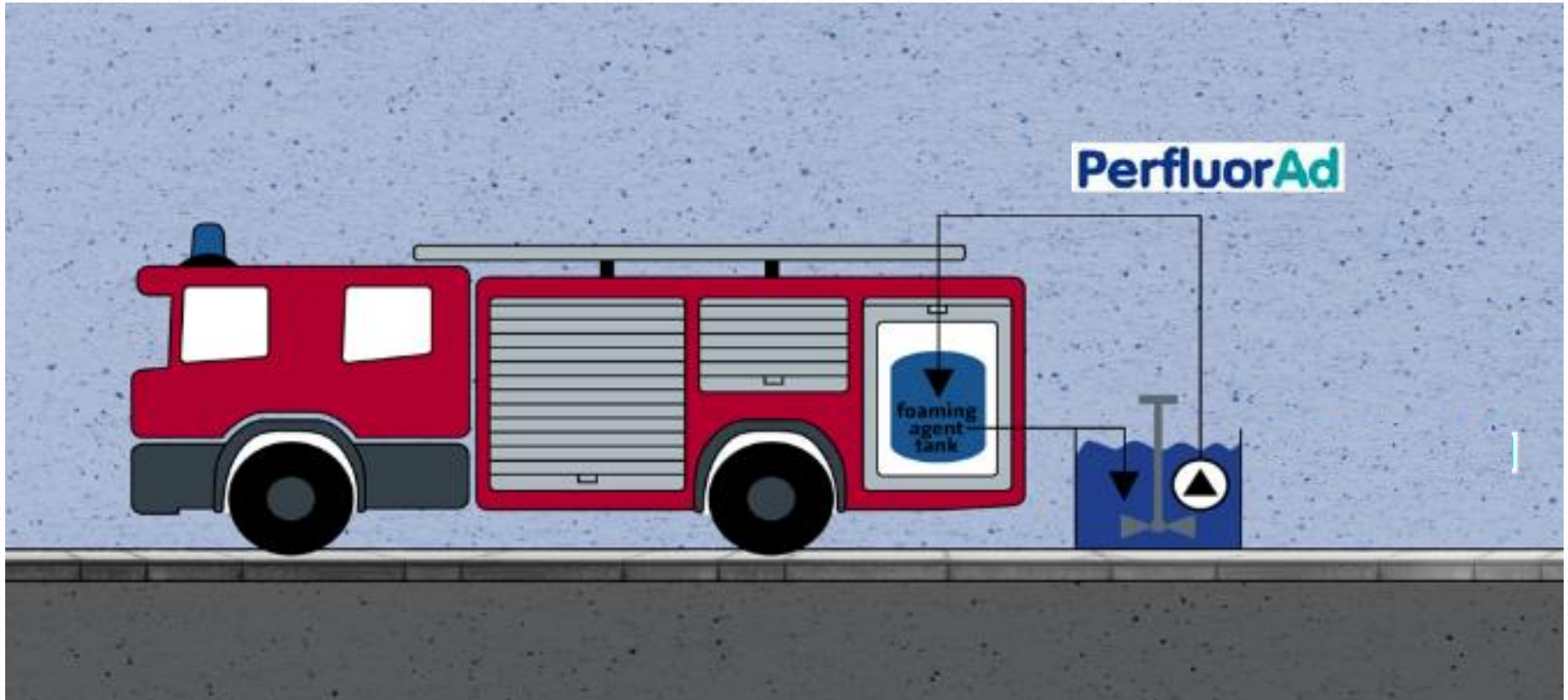


PFOA – PFHxS – PFOS - PFPeS

Results - FF Water



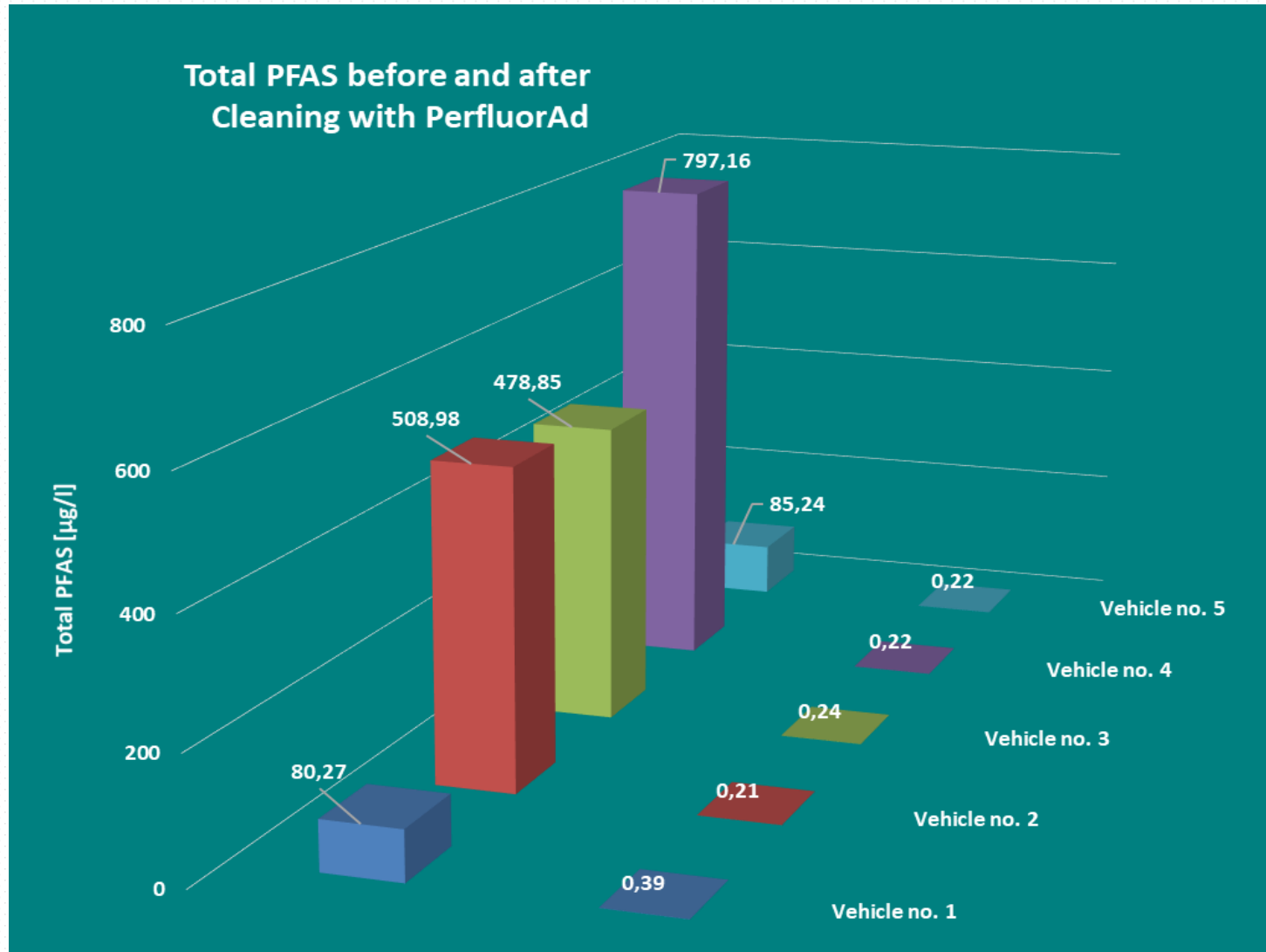
Decontamination of Trucks



Steps

- PerfluorAd solution for tank and pipework
- Optimises the removal of PFAS
- Removes PFAS from rinse water (floc)

Results - Truck & PerfluorAd



Conclusions

- new PFAS challenges
 - AFFF to F-free in Europe
 - High PFAS values in rinse water
- unknown compounds possible & present
 - PFAS, precursors
 - surfactants
- complex water chemistry
 - landfill,
 - industry



Conclusions

- high PFAS and/or complex water
- removal of PFAS as floc (particle)
- no interaction
- takes >85% of PFAS
- lowers the required volume of GAC/IX
- combination of treatment techniques

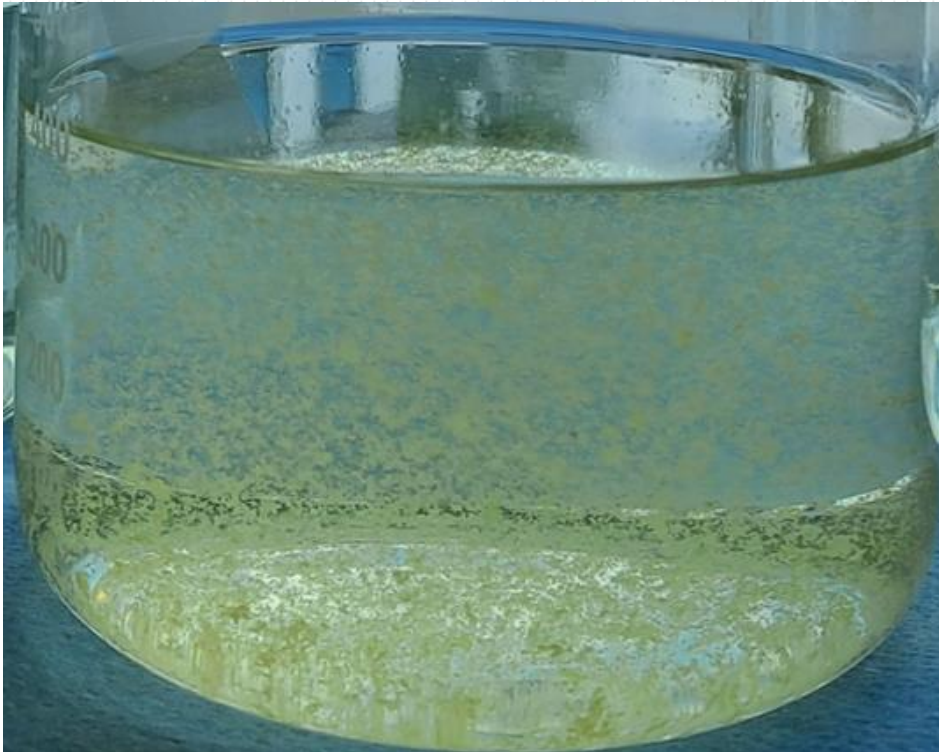
FF system at
helicopter port



Questions

- ??

- ??



Jurgen Buhl

0049 173 2585481

buhl@cornelsen.group

Fire-fighting System & PerfluorAd



Rinse with PerfluorAd

Sampling Feb 2023		Truck 3		Normal PFAS		Top Assay Results	
Acronym	Unit	Before Cleaning	After Cleaning			Raw Water after Top	Water from Cleaning
PFBA	µg/l	1,2	0,014			1.800	0,053
PFPeA	µg/l	<1	<0,01			4.100	0,09
PFHxA	µg/l	3,4	<0,01			3.200	0,043
PFHpA	µg/l	<1	<0,01			300	0,012
PFOA	µg/l	<1	<0,01			<100	<0,01
PFHxS	µg/l	<1	<0,01			<100	<0,01
PFHpS	µg/l	<1	<0,01			<100	<0,01
PFOS	µg/l	<1	<0,01			<100	<0,01
PFDaS	µg/l	<1	<0,01			<100	<0,01
4:2 FTS	µg/l	<1	<0,01			<100	<0,01
6:2 FTS	µg/l	200,0	0,011			<100	<0,01
8:2 FTS	µg/l	<1	<0,01			<100	<0,01
PF-3,7-DMOA	µg/l	<1	<0,01			<100	<0,01
HPFHpA	µg/l	<1	<0,01			<100	<0,01
PFTTrDA	µg/l	<0,01	<0,01			<100	<0,01
PFTeDA	µg/l	<0,01	<0,01			<100	<0,01
PFAS	µg/l	204,6	0,025			9.400,00	0,198
Removal	%		99,988				99,998