AMEOX® Technology
for PFAS Destruction…

…in Spent Granular Activated Carbon, Brines, & Concentrates.

"AMEOX processed GAC returned to PFAS water treatment service outperformed the original virgin GAC in adsorption capacity."

RAMBOLL

YB Technologies – Anacortes, WA

YB Technologies, LLC

Anacortes, WA

- Founded in the Pacific NW (2019)
- A Technology Applications Company providing:
  - Bench/Pilot-Scale Testing (efficacy/feasibility)
  - System Manufacture/Assembly (currently)
  - Equipment Leasing & Reagent Supply
  - Technical Support/Training
  - Sublicensing to Geographic Zone Applicators
- Zone & Specialty Use Applicators
  - Project-Based Full-scale Use (Operations)
  - Personnel Training by trained and approved trainers

All licensed technologies are patent(s)/patent(s) pending in the US and abroad

YB Technologies, LLC

Anacortes, WA

Treatment Technologies:

- AMEOX® Technology - PFAS destruction for fluid concentrates, brines, and spent GAC
- MBT™ Treatment Technology: Leachable PFAS fixation/sequestration; heavy metals in soils/solid waste
- Advanced Neutralization™ (AN™): Acidity treatment & heavy metal/Rare Earth Element removal for mine water and landfill leachate pretreatment
- Tri-axial Mixing Reactor: Water treatment process component for water/media contact interactions
- In-Mine Closure™ (In-Mine Closure): Abandoned/legacy and active mine closure (AMD prevention)

Technologies are patented/patent(s)-pending in the US and abroad

AMEOX® Destroys PFAS

in

- Granular Activated Carbon for its Rejuvenation and Re-use

- Aqueous Fluid Concentrates
- Brines and Other Fluids

…producing Fluoride and Carbon Dioxide

YB Technologies – Anacortes, WA

AMEOX® Full-Scale Dual Commercial Transportable Unit
2022 - current

AMEOX™ Treatment Technology Defined

Electrochemical Oxidation

- Boron-Doped Diamond electrode surfaces on Niobium substrate
- Minimizes over-potential for water cleavage and maximizes electron transfer
- Dimensionally stable/non-sacrificial

Cavitation

- Cavitation is the formation and collapse of propagating bubbles in liquid
- Bubbles have internal temperature increases to thousands of deg-Kelvin and pressure to hundrerds of bars
- Water vapor, oxygen and other constituents, are dissociated inside a bubble and yield oxidants such as ·OH, singlet O, ozone, peroxides, and others.

Sonolysis

- Ultrasonic energy creates propagating cavitation bubbles in water and generates oxidants
- Recognized technology for the destruction of organic pollutants in water
- Treatment results in the destruction of the C – F PFAS bonds
- PFAS molecules are reduced to fluoride ions and CO_2

AMEOX® Treatment Technology Components

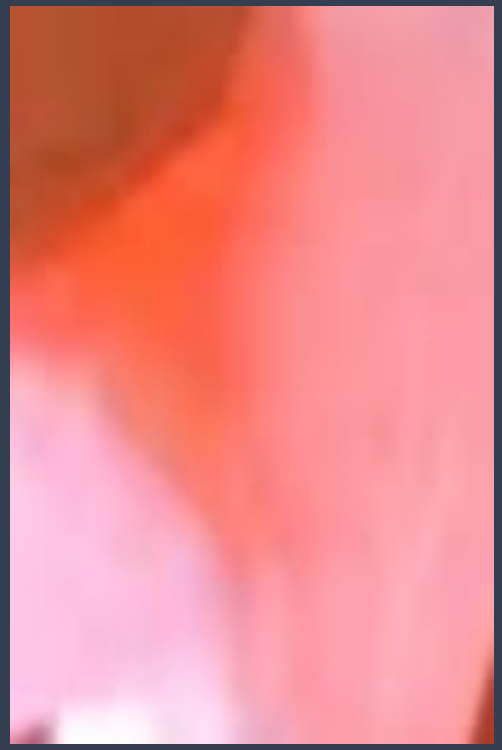
- Electrochemical Oxidation (Boron-Doped Diamond Electrodes)
- Cavitation (multiple forms)
- Sonolysis
- Intimate robust contact static mixing
- Oxidant Regeneration
- Closed-loop AMEOX Fluid Processing (No discharge/re-useable)
- In-media (carbon) & In-processor (desorbed) PFAS Destruction
- Oxidant Latency (**short-term half-life issues with hydroxyl radicals**)

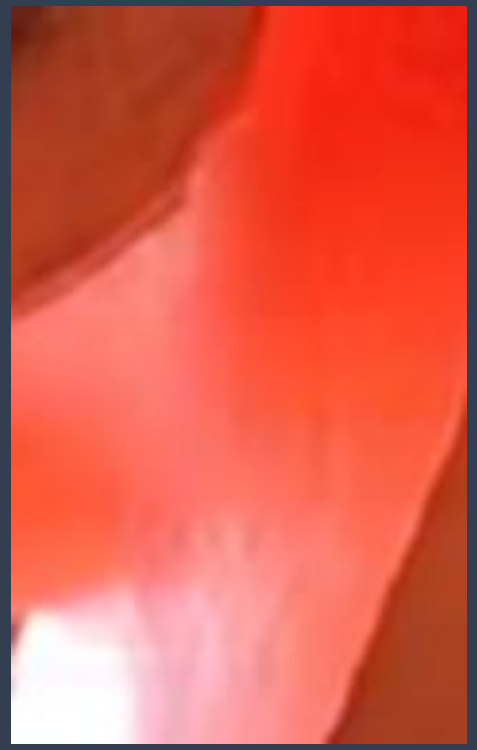
AMEOX® Technology Oxidants

Oxidation Potential for Common Oxidants

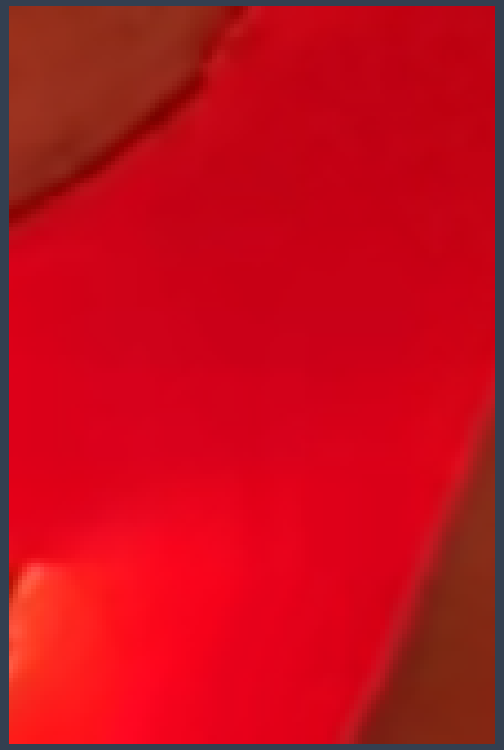
Oxidant	Oxidation Potential (V)
Fluorine (F_2)	3.0
Hydroxyl radical – acidic pH (•OH)	2.8
Sulfate radical ($•SO_4^-$)	2.6
Singlet (atomic) Oxygen (•O)	2.4
Ozone (O_3)	2.1
Persulfate ($S_2O_5^-$)	2.1
Hydroxyl radical – neutral pH (•OH)	1.8
Peroxymonosulfate (HSO_5^-)	1.8
Hydrogen Peroxide (H_2O_2)	1.8
Carbonate radical ($•CO_3^-$)	1.8
Perhydroxyl radical ($HO_2•$)	1.7
Percarbonate (as Sodium percarbonate)	1.6
Chlorine dioxide (ClO_2)	1.5
Chlorine (Cl_2)	1.4
Oxygen (O_2)	1.2
Hypochlorous Acid (HOCl)	0.95

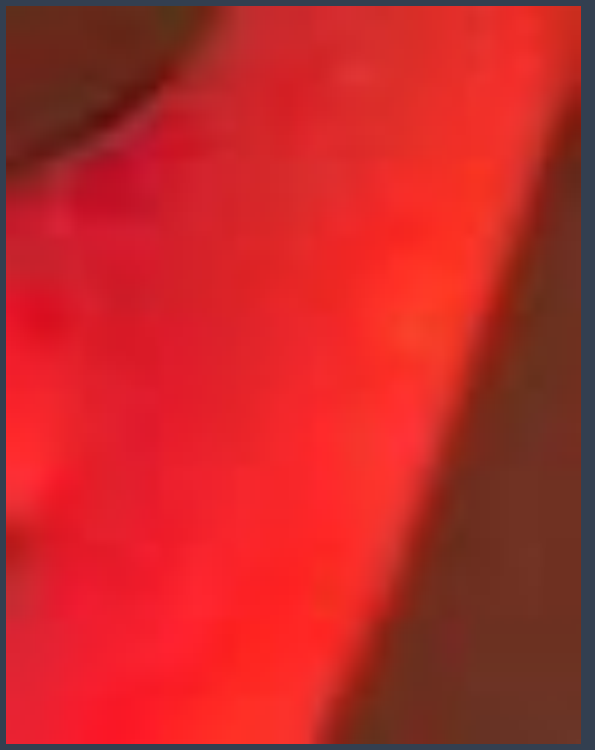
AMEOX™ Contact Static Mixing Reactor Dye Test





Inadequate Mixing





Corrected Mixing

AMEOX® Technology – How It Works:

For Granular Activated Carbon (GAC):

- AMEOX equipment attaches to carbon vessel containing PFAS-spent GAC
- AMEOX Fluid recirculates: Equipment through carbon bed in vessel back to equipment
- AMEOX Fluid delivers powerful oxidants to PFAS on GAC where PFAS is destroyed

For brines and fluid concentrates:

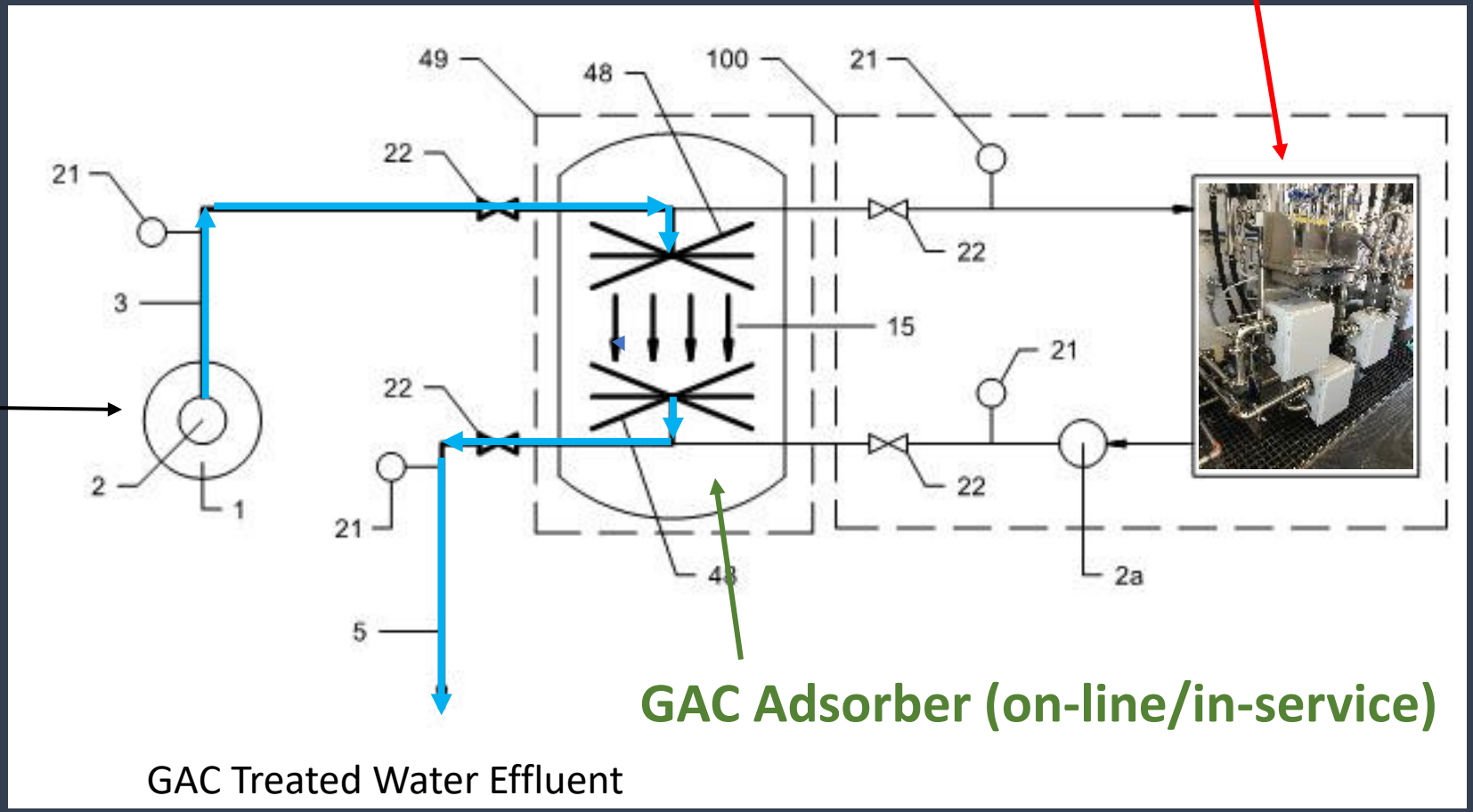
- AMEOX equipment attaches to a tank containing PFAS-laden brine/concentrate
- Fluid is circulated through AMEOX equipment back to tank to destroy PFAS
- AMEOX equipment generates powerful oxidants which destroy PFAS as fluid circulates

2022 AMEOX Commercial Scale Dual Unit

Treatment System within a Conex Box allows for mobility

On-site AMEOX Spent GAC Processing

AMEOX™ System (off-line)

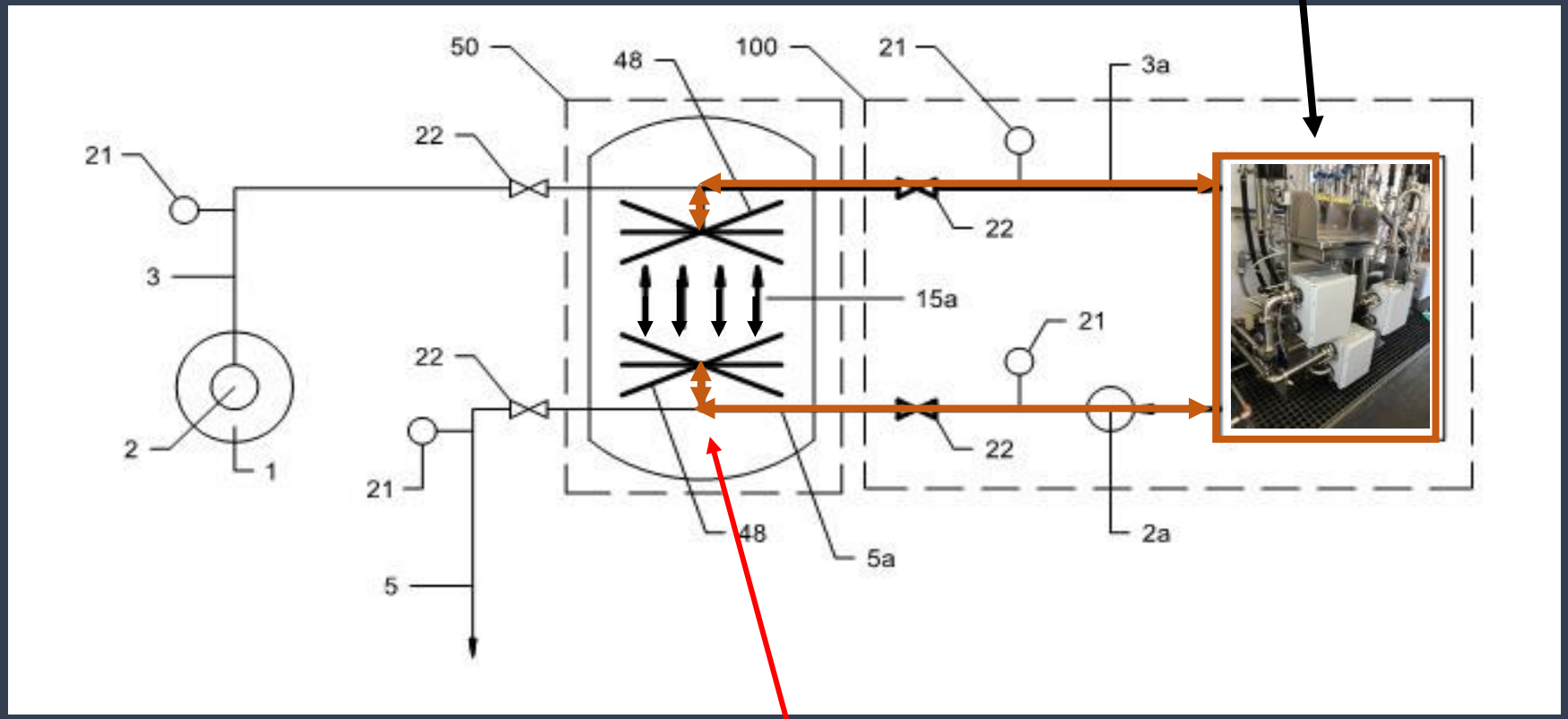


Raw Water

SEE OUR PFAS DESTRUCTION VIDEO: https://www.youtube.com/watch?v=L1jl7L7_rxo

On-site AMEOX Spent GAC Processing

AMEOX™ System (on-line/in-service)



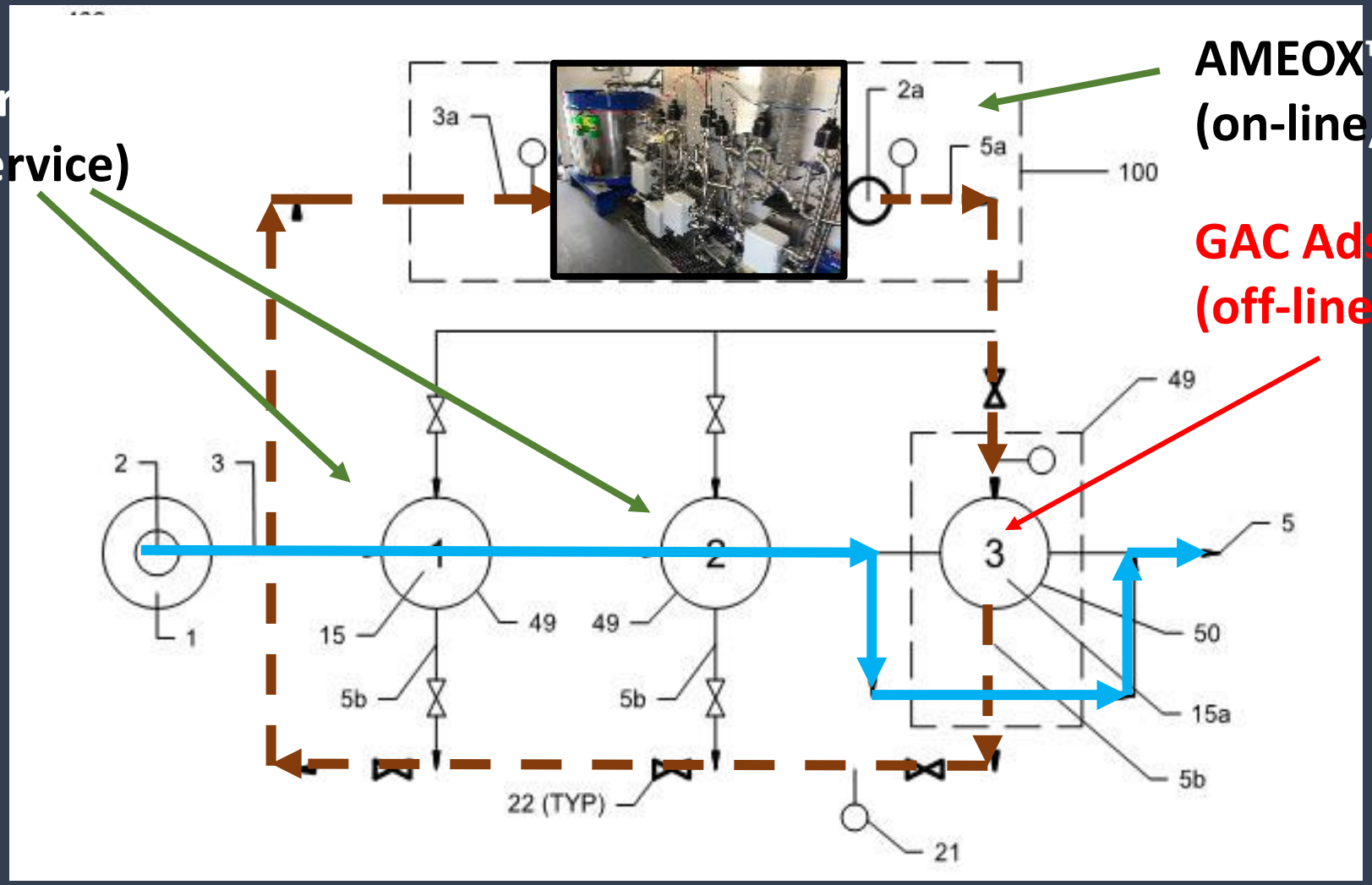
GAC Adsorber (off-line/out of service/in treatment)

SEE OUR PFAS DESTRUCTION VIDEO: https://www.youtube.com/watch?v=L1jl7L7_rxo

On-site AMEOX Spent GAC Processing – Absorber Train

GAC Adsorber (on-line/in-service)

Raw Water Source



AMEOX™ System (on-line/in-service)

GAC Adsorber (off-line/in-treatment)

GAC Treate
Water Effluent

AMEOX® Dual Commercial Unit in Operation 2022- current

Dual Unit in 20’ Shipping Container

1000# GAC
Absorber Reactor

2000# GAC
Absorber Reactor

AMEOX GAC Processing Data

AMEOX Treated GAC
Returned to Service – Landfill Leachate Treatment
Wyoming, MI
June - October 2022

As of October 19, 2022:

- **Use #1:** Originally used on PFAS groundwater pump & treat system >>AMEOX treated (data on right >>>>>)
- **Use #2:** Landfill leachate decant >> AMEOX treated
- **Use #3:** Landfill leachate decant

			UNTREATED	Treated
		Lab:	ALS	ALS
		Sample ID:	06272022-1015	07252022-1020
		Elapsed Treatment Time (Hrs.)	0	37.6
		Matrix:	GAC	GAC
		Supplemental Processing:		
			Total PFAS	Total PFAS
PFAS Telomeres	Chemical Name	C Atoms	(ng/Kg - dry wt.)	(ng/Kg - dry wt.)
PFBA	Perfluorobutanoic Acid	C4	**4,100**	1,700
PFPeA	Perfluoropentanoic Acid	C5	**4,600**	1,700
PFHxA	Perfluorohexanoic Acid	C6	<29,000	4,000
PFHpA	Perfluoroheptanoic Acid	C7	<29,000	2,400
PFOA	**Perfluorooctanoic Acid**	**C8**	**47,000**	**8,400**
PFNA	Perfluorononanoic Acid	C9	**560**	200
PFDA	Perfluorodecanoic Acid	C10	**610**	<250
PFUnA	Perfluoroundecanoic Acid	C11	<290	<250
PFDoA	Perfluorododenoic Acid	C12	<290	<250
PFTriA	Perfluorortridecanoic Acid	C13	<290	<250
PFTeA	Perfluortetradecanoic Acid	C14	<290	<250
PFBS	Perfluorobutanesulfonic Acid	C4	**31,000**	3,100
PFPeS	Perfluoropentanesulfonic Acid	C5	**8,700**	830
PFHxS	Perfluorohexanesulfonic Acid	C6	**59,000**	4,200
PFHpS	Perfluoroheptanesulfonic Acid	C7	62,000	3,900
PFOS	**Perfluorooctanesulfonic Acid**	**C8**	**7,500,000**	**780,000**
PFNS	Perfluorononanesulfonic Acid	C9	**1,300**	<250
PFDS	Perfluorodecanesulfonic Acid	C10	<59	<51
FtSA 4:2	Fluorotelomer Sulfonic Acid 4:2	C6	<290	<250
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	C8	**3,400**	<250
FtSA 8:2	Fluorotelomer Sulfonic Acid 8:2	C10	<290	<250
PFOSA	Perfluorooctanesulfonaminde	C8	67	<51
N-EtFOSSA	N-Ethylperfluorooctranesulfonic	C12	<290	<250
N-MeFOSAA	N-Methylperfluorooctranesulfonice	C11	<290	<250
F-53BMin	11Cl-Pf3OUds	C10	<59	<51
DONA	4,8-Doxa-3H-perfluorononanoic Acid	C8	<59	<51
F-53BMaj	9Cl-PF3ONS	C8	<59	<51
HFPO-DA	Hexafluoropropylene	C3	<290	<250
% Moisture	% Moisture		**58**	55
	Summation of PFOA and PFOS:		**7,547,000**	**788,400**
	Summation of PFAS Telomeres:		**7,722,337**	**810,430**
Lab testing by ALS, Holland, MI				-89.6%
				-89.5%

AMEOX® Dual Commercial Unit in Operation (January 2024)

10,000# Trailered GAC Absorbers (2 on left)
AMEOX Dual Unit in 20’ Shipping Container (rt.)

AMEOX GAC Processing (-8°F)

EVENT #1: AMEOX GAC Processing Data – 10K# Lead Cell

Winter/Spring 2024

>80% PFAS Destruction

High Level Metals Removal

Rejuvenated GAC for Re-Use May 2024

GAC and Absorber
(2) 10k lbs. carbon cells on semi trailer
Lead Cell 1 (9,000 lbs.) - Located at front of trailer
Lag Cell 2 (9,000 lbs.) - Located at rear of trailer

				Source:	CONFIDENTIAL 10,000# GAC - Absorber Cell 1 (Lead)	
				Sample Type:	Untreated PFAS GAC	AMEOX Treated
				Analytes:	PFAS Totals/ Metals	PFAS Totals/ Metals
				Matrix:	GAC	GAC
				Phase:	CHARACTERIZATION	Post Treatment
				Sample ID:	11302023-1445	02082024W-0830
				Method:	E-537 Mod	E-537 Mod
				Units (unless noted):	(ng/Kg-dry wt.)	(ng/Kg-dry wt.)
Telomere	Chemical Name	CAS No.	C Atoms		Result	Result
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8		<1800	3,900
PFBS	**Perfluorobutanesulfonic Acid**	**375-73-5**	**C4**		**11,000**	**3,800**
PFBA	**Perfluorobutanoic Acid**	**375-22-4**	**C4**		**40,000**	**26,000**
PFHpS	Perfluoroheptanesulfonic Acid	375-92-8	C7		15,000	4,000
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7		15,000	5,000
PFHxS	**Perfluorohexanesulfonic Acid**	**355-46-4**	**C6**		**37,000**	**11,000**
PFHxA	**Perfluorohexanoic Acid**	**307-24-4**	**C6**		**14,000**	**7,100**
PFNA	**Perfluorononanoic Acid**	**375-95-1**	**C9**		**6,300**	**2,400**
PFOS	**Perfluorooctanesulfonic Acid**	**1763-23-1**	**C8**		**520,000**	**74,000**
PFOA	**Perfluorooctanoic Acid**	**335-67-1**	**C8**		**29,000**	**12,000**
PFPeS	**Perfluoropentanesulfonic Acid**	**2706-91-4**	**C5**		**8,800**	**3,000**
PFPeA	**Perfluoropentanoic Acid**	**2706-90-3**	**C5**		**8,400**	**5,000**
HFPO-DA	**Hexafluoropropylene oxide dimer acid**	**13252-13-6**	**C6**		**<1800**	**<2100**
PFecHS	**Perfluoro-4-ethylcyclohexanesulfonic Acid**	**646-83-3**	**C8**		**880,000**	**140,000**
Al	**Aluminum**			**mg/Kg**	**1,600**	**400**
Ca	**Calcium**			**mg/Kg**	**3,800**	**98**
Fe	**Iron**			**mg/Kg**	**6,800**	**3,700**
Mn	**Manganese**			**mg/Kg**	**430**	**NA**
% Moisture					**45**	**53**
				Summation of PFOA and PFOS:	**549,000**	**86,000**
				*** Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA (GenX):**	**603,300**	**103,200**
				Summation of PFAS Telomere Totals:	**1,573,500**	**289,500**

		-84.3%
		-82.9%
		-81.6%

Non-detected PFAS telomeres not shown

EVENT #1: AMEOX GAC Processing Data – 10K# Lag Cell

Winter/Spring 2024

80% PFAS Destruction

High Level Metals Removal

Rejuvenated GAC for Re-Use May 2024

				CONFIDENTIAL 10,000# GAC - Absorber Cell 2 (Lag)		
GAC and Absorber		**Sample Type:**		**Untreated PFAS GAC**	**AMEOX Treated**	
(2) 10k lbs. carbon cells on semi trailer		**Analytes:**		**PFAS Totals/ Metals**	**PFAS Totals/ Metals**	
Lead Cell 1 (9,000 lbs.) - Located at front of trailer		**Matrix:**		**GAC**	**GAC**	
Lag Cell 2 (9,000 lbs.) - Located at rear of trailer		**Treatability Phase:**		**CHARACTERIZATION**	**Post Treatment**	
		Sample Source:		**Lag Cell 2**	**Lag Cell 2**	
		Sample ID:		**11302023-1400**	**01282024W-1100**	
		Method:		**E-537 Mod**	**E-537 Mod**	
		Units (unless noted):		**(ng/Kg-dry wt.)**	**(ng/Kg-dry wt.)**	**% Reduction**
Telomere	**Chemical Name**	**CAS No.**	**C Atoms**	**Result**	**Result**	**Result**
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8	**1,900**	<2200	ND
PFBS	**Perfluorobutanesulfonic Acid**	**375-73-5**	**C4**	**8,900**	**2,800**	**-68.5%**
PFBA	**Perfluorobutanoic Acid**	**375-22-4**	**C4**	**32,000**	**26,000**	**-18.8%**
PFHpS	Perfluoroheptanesulfonic Acid	375-92-8	C7	**9,800**	**3,100**	**-68.4%**
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7	**14,000**	**4,400**	**-68.6%**
PFHxS	**Perfluorohexanesulfonic Acid**	**355-46-4**	**C6**	**29,000**	**9,100**	**-68.6%**
PFHxA	**Perfluorohexanoic Acid**	**307-24-4**	**C6**	**14,000**	**7,200**	**-48.6%**
PFNA	**Perfluorononanoic Acid**	**375-95-1**	**C9**	**5,900**	**2,300**	**-61.0%**
PFOS	**Perfluorooctanesulfonic Acid**	**1763-23-1**	**C8**	**400,000**	**68,000**	**-83.0%**
PFOA	**Perfluorooctanoic Acid**	**335-67-1**	**C8**	**30,000**	**11,000**	**-63.3%**
PFPeS	**Perfluoropentanesulfonic Acid**	**2706-91-4**	**C5**	**6,700**	**2,200**	**-67.2%**
PFPeA	**Perfluoropentanoic Acid**	**2706-90-3**	**C5**	**7,400**	**4,000**	**-45.9%**
HFPO-DA	**Hexafluoropropylene oxide dimer acid**	**13252-13-6**	**C6**	**<1800**	**<2200**	
PFecHS	**Perfluoro-4-ethylcyclohexanesulfonic Acid**	**646-83-3**	**C8**	**950,000**	**170,000**	**-82.1%**
Al	**Aluminum**		**mg/Kg**	**1,800**	**400**	**-77.8%**
Ca	**Calcium**		**mg/Kg**	**3,100**	**120**	**-96.1%**
Fe	**Iron**		**mg/Kg**	**5,100**	**3,200**	**-37.3%**
Mn	**Manganese**		**mg/Kg**	**98**	**6.4**	**-93.5%**
% Moisture				**42**	**55**	
			Summation of PFOA and PFOS:	**430,000**	**79,000**	**-81.6%**
			*** Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA (GenX):**	**473,800**	**93,200**	**-80.3%**
			Summation of PFAS Telomere Totals:	**1,509,600**	**310,100**	**-79.5%**

Non-detected PFAS telomeres not shown

EVENT #2: AMEOX GAC Processing System Summer 2024

"Data from the AMEOX-treated GAC indicated approximately 80% of the total PFAS (dry-wt.) was destroyed, and foulant removal including Al, Ca, Fe, and Mn ranged from 37% to over 98%. AMEOX processed GAC returned to PFAS water treatment service outperformed the original virgin GAC in adsorption capacity."

Ramboll Americas Engineering Solutions, Inc.

EVENT #2: AMEOX GAC Processing Data – 10K# Lead Cell

Summer 2024

>80% PFAS Destruction

High Level
Metals Removal

Rejuvenated GAC for Re-Use
Fall 2024

Lead Cell - GAC and Absorber 2 x 10k lbs. carbon vessels on treatment semi trailer Lead Cell 1 (~/<9,000 lbs.) - Located at front of trailer				Sample Type: Analytes: Matrix: Sample Source: Method: Units (unless noted):	Untreated PFAS GAC PFAS Totals/ Metals GAC Event 2 - Lead Cell 1 E-537 Mod (ng/Kg-dry wt.)	Treated R2 PFAS Totals/ Metals GAC Event 2 - Lead Cell 1 E-537 Mod (ng/Kg-dry wt.)	% Reduction
Telomere	**Chemical Name**	**CAS No.**	**C Atoms**		**Result**	**Result**	
FtSA 4:2	Fluorotelomer Sulfonic Acid 4:2	757124-72-4	C6		<1500	<2100	
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8		<1500	**9,500**	**533.3%**
FtSA 8:2	Fluorotelomer Sulfonic Acid 8:2	39108-34-4	C10		<1500	<2100	
FtSA 10:2	Fluorotelomer Sulfonic Acid 10:2	120226-60-0	C12		<1500	<2100	
PFBS	**Perfluorobutanesulfonic Acid**	**375-73-5**	**C4**		**5,300**	**17,000**	**220.8%**
PFBA	**Perfluorobutanoic Acid**	**375-22-4**	**C4**		**11,000**	**2,600**	**-76.4%**
PFDS	Perfluorodecanesulfonic Acid	335-77-3	C10		<1500	<2100	
PFDA	Perfluorodecanoic Acid	335-76-2	C10		<1500	<2100	
PFDoS	Perfluorododecanesulfonic Acid	79780-39-5	C12		<1500	<2100	
PFDoA	Perfluorododenoic Acid	307-55-1	C12		<1500	<2100	
PFHpS	Perfluoroheptanesulfonic Acid	375-92-8	C7		**8,800**	**2,400**	**-72.7%**
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7		**7,800**	**<2100**	
PFHxDA	Perfluorohexadecanoic Acid	67905-19-5	C16		<1500	<2100	
PFHxS	**Perfluorohexanesulfonic Acid**	**355-46-4**	**C6**		**17,000**	**19,000**	**11.8%**
PFHxA	**Perfluorohexanoic Acid**	**307-24-4**	**C6**		**6,300**	**<2100**	
PFNS	Perfluorononanesulfonic Acid	68259-12-1	C9		1,500	<2100	
PFNA	**Perfluorononanoic Acid**	**375-95-1**	**C9**		**4,700**	**<2100**	**> -55.3%**
PFODA	Perfluorooctadecanoic Acid	16517-11-6	C18		<1500	<2100	
PFOSA	Perfluorooctanesulfonaminde	754-91-6	C8		<1500	<2100	
PFOS	**Perfluorooctanesulfonic Acid**	**1763-23-1**	**C8**		**580,000**	**110,000**	**-81.0%**
PFOA	**Perfluorooctanoic Acid**	**335-67-1**	**C8**		**15,000**	**<2100**	**> -86.0%**
PFPeS	**Perfluoropentanesulfonic Acid**	**2706-91-4**	**C5**		**4,100**	**3,400**	**-17.1%**
PFPeA	**Perfluoropentanoic Acid**	**2706-90-3**	**C5**		**4,200**	**<2100**	**> -50.0%**
PFTeA	Perfluortetradecanoic Acid	376-06-7	C14		<1500	<2100	
PFTrDA	Perfluorortridecanoic Acid	72629-94-8	C13		<1500	<2100	
PFUnA	Perfluoroundecanoic Acid	2058-94-8	C11		<1500	<2100	
	N-ethylperfluoro-1-octanesulfonamide	936109-40-9	C10		<1500	<2100	
N-EtFOSSA	N-Ethylperfluorooctanesulfonamidoacetic Acid	2991-50-6	C12		<1500	<2100	
	N-Ethylperfluorooctanesulfonamidoethanol	N/A	C12		<1500	<2100	
N-MeFOSA	N-methylperfluoro-1-octanesulfonamide	31506-32-8	C9		<1500	<2100	
N-MeFOSAA	N-Methylperfluorooctanesulfonamidoacetic Acid	2355-31-9	C11		<1500	<2100	
N-MeFOSE	N-Methylperfluorooctanesulfonamidoethanol	24448-09-7	C11		<1500	<2100	
HFPO-DA	**Hexafluoropropylene oxide dimer acid**	**13252-13-6**	**C6**		**7,600**	**<2100**	**> - 72.4%**
ADONA	4,8-Dioxa-3H-perfluorononanoic Acid	919005-14-4	C8		<1500	<2100	
F-53BMin	11Cl-PF3OUds	763051-92-9	C10		<1500	<2100	
F-53BMaj	9Cl-PF3ONS	756426-58-1	C8		<1500	<2100	
PFecHS	**Perfluoro-4-ethylcyclohexanesulfonic Acid**	**646-83-3**	**C8**		**680,000**	**83,000**	**-87.8%**
PFBSA	Perfluorobutylsulfonamide	30334-69-1	C4		<1500	<2100	
PFHxSA	Perfluorohexanesulfonamide	41997-13-1	C6		<1500	<2100	
Parameter							
Al	**Aluminum**	SW3050B	**mg/Kg**		**770**	**10,000**	**1199%**
Ca	**Calcium**	SW3050B	**mg/Kg**		**2,300**	**1,500**	**-35%**
Fe	**Iron**	SW3050B	**mg/Kg**		**4,300**	**3,600**	**-16%**
Mn	**Manganese**	SW3050B	**mg/Kg**		**150**	**33.0**	**-78%**
% Moisture		SW3550C	**%**		**34**	**52**	
			Summation of PFOA and PFOS:		**595,000**	**110,000**	**-81.5%**
			*** Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA):**		**622,000**	**<150,200**	**> - 75.9%**
			Summation of PFAS Telomere Totals:		**1,348,000**	**220,400**	**-83.6%**

EVENT #2: AMEOX GAC Processing Data – 10K# Lag Cell

Summer 2024

>80% PFAS Destruction

High Level Metals Removal

Rejuvenated GAC for Re-Use
Fall 2024

Lag Cell - GAC and Absorber				Sample Type:	Untreated	Treated	
				Analytes:	PFAS Totals / Metals	PFAS Totals / Metals	
				Matrix:	GAC	GAC	
				Sample Source:	Event 2 - Lag Cell 2	Event 2 - Lag Cell 2	
				Method:	E-537 Mod	E-537 Mod	
				Units (unless noted):	(ng/Kg-dry wt.)	(ng/Kg-dry wt.)	% Reduction
Telomere	Chemical Name	CAS No.	C Atoms		Result	Result	
FtSA 4:2	Fluorotelomer Sulfonic Acid 4:2	757124-72-4	C6		<2000	<21800	
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8		<2000	<2270	
FtSA 8:2	Fluorotelomer Sulfonic Acid 8:2	39108-34-4	C10		<2000	<22300	
FtSA 10:2	Fluorotelomer Sulfonic Acid 10:2	120226-60-0	C12		<2000	<2310	
PFBS	**Perfluorobutanesulfonic Acid**	**375-73-5**	**C4**		**6,100**	**<2110**	**> -65.4%**
PFBA	**Perfluorobutanoic Acid**	**375-22-4**	**C4**		**13,000**	**3,160**	**-75.7%**
PFDS	Perfluorodecanesulfonic Acid	335-77-3	C10		<2000	<2310	
PFDA	Perfluorodecanoic Acid	335-76-2	C10		<2000	<2390	
PFDoS	Perfluorododecanesulfonic Acid	79780-39-5	C12		<2000	<22,600	
PFDoA	Perfluorododenoic Acid	307-55-1	C12		<2000	<2390	
PFHpS	Perfluoroheptanesulfonic Acid	375-92-8	C7		**14,000**	<2280	**> - 83.7%**
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7		**9,300**	<2390	**> - 74.3%**
PFHxDA	Perfluorohexadecanoic Acid	67905-19-5	C16		<2000	<2390	
PFHxS	**Perfluorohexanesulfonic Acid**	**355-46-4**	**C6**		**27,000**	**2,930**	**-89.1%**
PFHxA	**Perfluorohexanoic Acid**	**307-24-4**	**C6**		**9,300**	**<2390**	**> - 74.3%**
PFNS	Perfluorononanesulfonic Acid	68259-12-1	C9		<2000	<2390	
PFNA	**Perfluorononanoic Acid**	**375-95-1**	**C9**		**7,400**	**<2390**	**> - 67.7%**
PFODA	Perfluorooctadecanoic Acid	16517-11-6	C18		<2000	<2390	
PFOSAm	Perfluorooctane sulfonamide	754-91-6	C8		<2000	<2390	
PFOS	**Perfluorooctanesulfonic Acid**	**1763-23-1**	**C8**		**710,000**	**104,000**	**-85.4%**
PFOA	**Perfluorooctanoic Acid**	**335-67-1**	**C8**		**23,000**	**3,450**	**-85.0%**
PFPeS	**Perfluoropentanesulfonic Acid**	**2706-91-4**	**C5**		**6,200**	**<2390**	**> - 61.5%**
PFPeA	**Perfluoropentanoic Acid**	**2706-90-3**	**C5**		**5,400**	**<2390**	**> - 55.7%**
PFTDA	Perfluortetradecanoic Acid	376-06-7	C14		<2000	<23,300	
PFTrDA	Perfluorortridecanoic Acid	72629-94-8	C13		<2000	<2390	
PFUnDA	Perfluoroundecanoic Acid	2058-94-8	C11		<2000	<2390	
EtFOSAm	N-ethylperfluoro-1-octane sulfonamide	936109-40-9	C10		<2000	<2390	
NEtFOSSA	N-Ethylperfluorooctanesulfonamidoacetic Acid	2991-50-6	C12		<2000	<2390	
EtFOSE	N-Ethylperfluorooctane sulfonamidoethanol	N/A	C12		<2000	<23,300	
N-MeFOSA	N-methylperfluorooctane sulfonamide	31506-32-8	C9		<2000	<23,300	
N-MeFOSAA	N-Methylperfluorooctane sulfonamido acetic Acid	2355-31-9	C11		<2000	<23,300	
N-MeFOSE	N-Methylperfluorooctane sulfonamidoethanol	24448-09-7	C11		<2000	2,390	
HFPO-DA	**Hexafluoropropylene oxide dimer acid**	**13252-13-6**	**C6**		**15,000**	**2,830**	**-81.1%**
DONA	4,8-Dioxa-3H-perfluorononanoic Acid	919005-14-4	C8		<2000	<2250	
F-53BMin	11Cl-PF3OUds	763051-92-9	C10		<2000	<2250	
F-53BMaj	9-Cl-PF3ONS	756426-58-1	C8		<2000	<2230	
PFecHS	**Perfluoro-4-ethylcyclohexanesulfonic Acid**	**646-83-3**	**C8**		**780,000**	**178,000**	**-77.2%**
PFBSA	Perfluorobutylsulfonamide	30334-69-1	C4		<2000	<2390	
PFHxSA	Perfluorohexanesulfonamide	41997-13-1	C6		<2000	<2390	
Parameter							
Al	**Aluminum**	SW3050B	mg/Kg		**770**	**741**	**-3.8%**
Ca	**Calcium**	SW3050B	mg/Kg		**840**	**82**	**-90.2%**
Fe	**Iron**	SW3050B	mg/Kg		**4,500**	**894**	**-80.1%**
Mn	**Manganese**	SW3050B	mg/Kg		**26**	**5.95**	**-77.1%**
% Moisture		SW3550C	%		**50**	**57.1**	
				Summation of PFOA and PFOS:	733,000	107,450	-85.3%
				* Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA:	773,500	<114,300	> - 85.2%
				Summation of PFAS Telomere Totals:	1,625,700	296,760	-81.7%

AMEOX Performance Indicators:

1. Commercial GAC re-use record with performance enhanced over new GAC
2. Decrease in PFAS telomere concentrations
3. Carbon dioxide – low level (ppt) real-time monitoring not viable
4. ***Fluoride*** increase in AMEOX Re-circulation Process Fluid:

Program	Parameter	Pre-AMEOX	Post-AMEOX
2020 - Prineville, OR	F^- (mg/L)	<0.1	**0.21**
2022 - Wyoming, MI	F^- (mg/L)	0.8	**7.48**
2023-24 Wyoming, MI	F^- (mg/L)	0.8	**41.6**

5. ***Iron/Calcium*** **in GAC**

2022 – Wyoming, MI	Iron (mg/Kg)	18,000	**2,500**
2024 – Wyoming, MI	Calcium (mg/Kg)	9,300	**2,200**

AMEOX® Fluid

Residual Solids (2024)

- Post-AMEOX Processing of 2 x 10K lbs. GAC Absorbers
- PFAS Telemers all N.D. in recovered solids
- Metals removed from exhausted GAC during AMEOX processing
- Consolidated solids suitable for dewatering and subsequent disposal in a RCRA Subtitle D Non-Hazardous waste landfill

AMEOX Fluids: Solids **2 x 10,000 lbs. GAC Absorber Processing** **Consolidated Solids after precipitation, settling, and decant from AMEOX Fluid**			**Source:** **Sample Type:** **Sample ID:** **Method:**	**AMEOX Fluid: Post-GAC Processing** **Settled Solids** **Post GAC AMEOX Treatment** **CT Solids - (9/2024)** **E-537 Mod**
Telomere	**Chemical Name**	**CAS No.**	**C Atoms**	**Result (ug/Kg-dry wt.**
F-53BMin	11Cl-PF3OUds	763051-92-9	C10	<33.0
FtSA 8:2	Fluorotelomer Sulfonic Acid 8:2	39108-34-4	C10	<33.5
FtSA 10:2	Fluorotelomer Sulfonic Acid 10:2	120226-60-0	C12	<33.8
FtSA 4:2	Fluorotelomer Sulfonic Acid 4:2	757124-72-4	C6	<32.7
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8	<33.2
FTCA 7:3	2H,2H,3H,3H-Perfluorodecanoic acid 7:3	812-70-4	C10	<35.0
FTCA 3:3	2H,2H,3H,3H-Perfluorohexanoic acid 3:3	356-02-5	C6	<35.0
FTCA 5:3	2H,2H,3H,3H-Perfluorooctanoic acid 5:3	914637-49-3	C8	<35.0
DONA	4,8-Dioxa-3H-perfluorononanoic Acid	919005-14-4	C8	<33.0
F-53BMaj	9-Cl-PF3ONS	756426-58-1	C8	<32.6
HFPO-DA	Hexafluoropropylene oxide dimer acid	13252-13-6	C6	<35.0
EtFOSAm	N-Ethylperfluorooctane sulfonamide	936109-40-9	C10	<35.0
NEtFOSSA	N-Ethylperfluorooctane sulfonamido acetic Acid	2991-50-6	C12	<35.0
EtFOSE	N-Ethylperfluorooctane sulfonamido ethanol	1691-99-2	C12	<35.0
N-MeFOSA	N-methylperfluorooctane sulfonamide	31506-32-8	C9	<35.0
N-MeFOSAA	N-Methylperfluorooctane sulfonamido acetic Acid	2355-31-9	C11	<35.0
N-MeFOSE	N-Methylperfluorooctane sulfonamido ethanol	24448-09-7	C11	<35.0
PFecHS	Perfluoro-4-ethylcyclohexanesulfonic Acid	646-83-3	C8	<35.0
PFBS	Perfluorobutanesulfonic Acid	375-73-5	C4	<31.0
PFBA	Perfluorobutanoic Acid	375-22-4	C4	<35.0
PFBSA	Perfluorobutylsulfonamide	30334-69-1	C4	<35.0
PFDS	Perfluorodecane sulfonic Acid	335-77-3	C10	<33.8
PFDA	Perfluorodecanoic Acid	335-76-2	C10	<35.0
PFDoS	Perfluorododecane sulfonic Acid	79780-39-5	C12	>33.9
PFDoA	Perfluorododecanoic Acid	307-55-1	C12	<35.0
PFHpS	Perfluoroheptane sulfonic Acid	375-92-8	C7	<33.3
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7	<35.0
PFHxDA	Perfluorohexadecanoic Acid	67905-19-5	C16	<35.0
PFHxS	Perfluorohexane sulfonic Acid	355-46-4	C6	<35.0
PFHxSA	Perfluorohexanesulfonamide	41997-13-1	C6	<35.0
PFHxA	Perfluorohexanoic Acid	307-24-4	C6	<35.0
PFNS	Perfluorononane sulfonic Acid	68259-12-1	C9	<35.0
PFNA	Perfluorononanoic Acid	375-95-1	C9	<35.0
PFODA	Perfluorooctadecanoic Acid	16517-11-6	C18	<35.0
PFOSAm	Perfluorooctane sulfonamide	754-91-6	C8	<35.0
PFOS	Perfluorooctane sulfonic Acid	1763-23-1	C8	<35.0
PFOA	Perfluorooctanoic Acid	335-67-1	C8	<35.0
PFPeS	Perfluoropentane sulfonic Acid	2706-91-4	C5	<35.0
PFPeA	Perfluoropentanoic Acid	2706-90-3	C5	<35.0
PFTDA	Perfluortetradecanoic Acid	376-06-7	C14	<35.0
PFTrDA	Perfluorortridecanoic Acid	72629-94-8	C13	<35.0
PFUnDA	Perfluoroundecanoic Acid	2058-94-8	C11	<35.0
Parameter				
Al	**Aluminum**	SW3050B	**mg/Kg-dry**	**15,300**
Ca	**Calcium**	SW3050B	**mg/Kg-dry**	**126,000**
Fe	**Iron**	SW3050B	**mg/Kg-dry**	**8,130**
Mn	**Manganese**	SW3050B	**mg/Kg-dry**	**16,900**
% Moisture		SW3550C	**%**	**97.1**
			Summation of PFOA and PFOS:	**<70 (ND)**
			*** Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA:**	**<206 (ND)**
			Summation of PFAS Telomere Totals:	**<1448.8 (ND)**

AMEOX® Technology for PFAS Destruction (August 2022)

Beneficial Iron Removal from Spent GAC

Untreated GAC: **18,000 mg/Kg**
Treated GAC: **2,500 mg/Kg**

AMEOX® Fluid

Re-Use Data (2023-2024)

- PFAS “ND” in AMEOX fluid & settled solids.
- Fluoride generated during PFAS destruction and removed from fluid with Al, Ca, Fe, and Mn foulants.
- F^- background in city makeup water for AMEOX fluid was 0.8 mg/L. Foulant metals sourced from carbon.
- AMEOX fluid returned for re-use to destory PFAS in GAC.
- Fluid processed for metals and fluoride multiple times since spring 2023.
- Solids accumulated since start of processing.

AMEOX Fluid and Solids			Source:	Cone Tank	
AMEOX fluid = Supernate after solids settling and decant			Sample Type:	Supernate Decant	Settled Solids
Solids = Solids after settling and decant of AMEOX fluid			Analytes:	PFAS Totals/ Metals	PFAS Totals/ Metals
Solids accumulated for nearly 1 year			Matrix:	AMEOX Fluid	Solids
			Lab:	ALS	ALS
			PFAS Method:	E-537 Mod	E-537 Mod
			Units (unless noted):	(ng/L)	(ug/Kg-dry wt.)
Telomere	Chemical Name	CAS No.	C Atoms	Result	Result
FtSA 4:2	Fluorotelomer Sulfonic Acid 4:2	757124-72-4	C6	<5.0	<35
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8	<5.0	<35
FtSA 8:2	Fluorotelomer Sulfonic Acid 8:2	39108-34-4	C10	<5.0	<35
FtSA 10:2	Fluorotelomer Sulfonic Acid 10:2	120226-60-0	C12	<5.0	<35
PFBS	**Perfluorobutanesulfonic Acid**	**375-73-5**	**C4**	<5.0	<35
PFBA	**Perfluorobutanoic Acid**	**375-22-4**	**C4**	<5.0	<35
PFDS	Perfluorodecanesulfonic Acid	335-77-3	C10	<5.0	<35
PFDA	Perfluorodecanoic Acid	335-76-2	C10	<5.0	<35
PFDoS	Perfluorododecanesulfonic Acid	79780-39-5	C12	<5.0	<35
PFDoA	Perfluorododenoic Acid	307-55-1	C12	<5.0	<35
PFHpS	Perfluoroheptanesulfonic Acid	375-92-8	C7	<5.0	<35
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7	<5.0	<35
PFHxDA	Perfluorohexadecanoic Acid	67905-19-5	C16	<5.0	<35
PFHxS	**Perfluorohexanesulfonic Acid**	**355-46-4**	**C6**	<5.0	<35
PFHxA	**Perfluorohexanoic Acid**	**307-24-4**	**C6**	<5.0	<35
PFNS	Perfluorononanesulfonic Acid	68259-12-1	C9	<5.0	<35
PFNA	**Perfluorononanoic Acid**	**375-95-1**	**C9**	<5.0	<35
PFODA	Perfluorooctadecanoic Acid	16517-11-6	C18	<5.0	<35
PFOSA	Perfluorooctanesulfonaminde	754-91-6	C8	<5.0	<35
PFOS	**Perfluorooctanesulfonic Acid**	**1763-23-1**	**C8**	<5.0	<35
PFOA	**Perfluorooctanoic Acid**	**335-67-1**	**C8**	<5.0	<35
PFPeS	**Perfluoropentanesulfonic Acid**	**2706-91-4**	**C5**	<5.0	<35
PFPeA	**Perfluoropentanoic Acid**	**2706-90-3**	**C5**	<5.0	<35
PFTeA	Perfluortetradecanoic Acid	376-06-7	C14	<5.0	<35
PFTrDA	Perfluorortridecanoic Acid	72629-94-8	C13	<5.0	<35
PFUnA	Perfluoroundecanoic Acid	2058-94-8	C11	<5.0	<35
	N-ethylperfluoro-1-octanesulfonamide	936109-40-9	C10	<5.0	<35
N-EtFOSSA	N-Ethylperfluorooctanesulfonamidoacetic Acid	2991-50-6	C12	<5.0	<35
	N-Ethylperfluorooctanesulfonamidoethanol	N/A	C12	<5.0	<35
N-MeFOSA	N-methylperfluoro-1-octanesulfonamide	31506-32-8	C9	<5.0	<35
N-MeFOSAA	N-Methylperfluorooctanesulfonamidoacetic Acid	2355-31-9	C11	<5.0	<35
N-MeFOSE	N-Methylperfluorooctanesulfonamidoethanol	24448-09-7	C11	<5.0	<35
HFPO-DA	**Hexafluoropropylene oxide dimer acid**	**13252-13-6**	**C6**	<5.0	<35
ADONA	4,8-Dioxa-3H-perfluorononanoic Acid	919005-14-4	C8	<5.0	<35
F-53BMin	11Cl-PF3OUds	763051-92-9	C10	<5.0	<35
F-53BMaj	9Cl-PF3ONS	756426-58-1	C8	<5.0	<35
PFecHS	**Perfluoro-4-ethylcyclohexanesulfonic Acid**	**646-83-3**	**C8**	<5.0	<35
PFBSA	Perfluorobutylsulfonamide	30334-69-1	C4	<5.0	<35
PFHxSA	Perfluorohexanesulfonamide	41997-13-1	C6	<5.0	<35
Parameter					
F^-	**Fluoride (SW9056A)**			**<0.40 mg/L**	**41.6**
Al	**Aluminum (SW3015A / 3050B)**			**0.11 mg/L**	**15,000**
Ca	**Calcium (SW3015A / 3050B)**			**330 mg/L**	**100,000**
Fe	**Iron (SW3015A / 3050B)**			**0.26 mg/L**	**42,000**
Mn	**Manganese (SW3050B)**			**N/A**	**20,000**
% Moisture	**Moisture (SW3550C)**		**% of sample:**	**N/A**	**97**
			Summation of PFOA and PFOS:	**Non-Detect**	**Non-Detect**
			*** Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA (GenX):**	**Non-Detect**	**Non-Detect**
			Summation of PFAS Telomere Totals:	**Non-Detect**	**Non-Detect**

AMEOX® Treated Carbon

Inorganic Parameters (2023-24)

Parameter	Untreated GAC	AMEOX Treated GAC
Iron	18,000	2500
Aluminum	5100	2600
Calcium	9300	2200
Manganese	2800	400
Alkalinity (total as CaCO3)	250	ND (<170)

* All units as mg/Kg (dry wt.)

AMEOX GAC Processing Data

PFOA & PFOS to <DL's

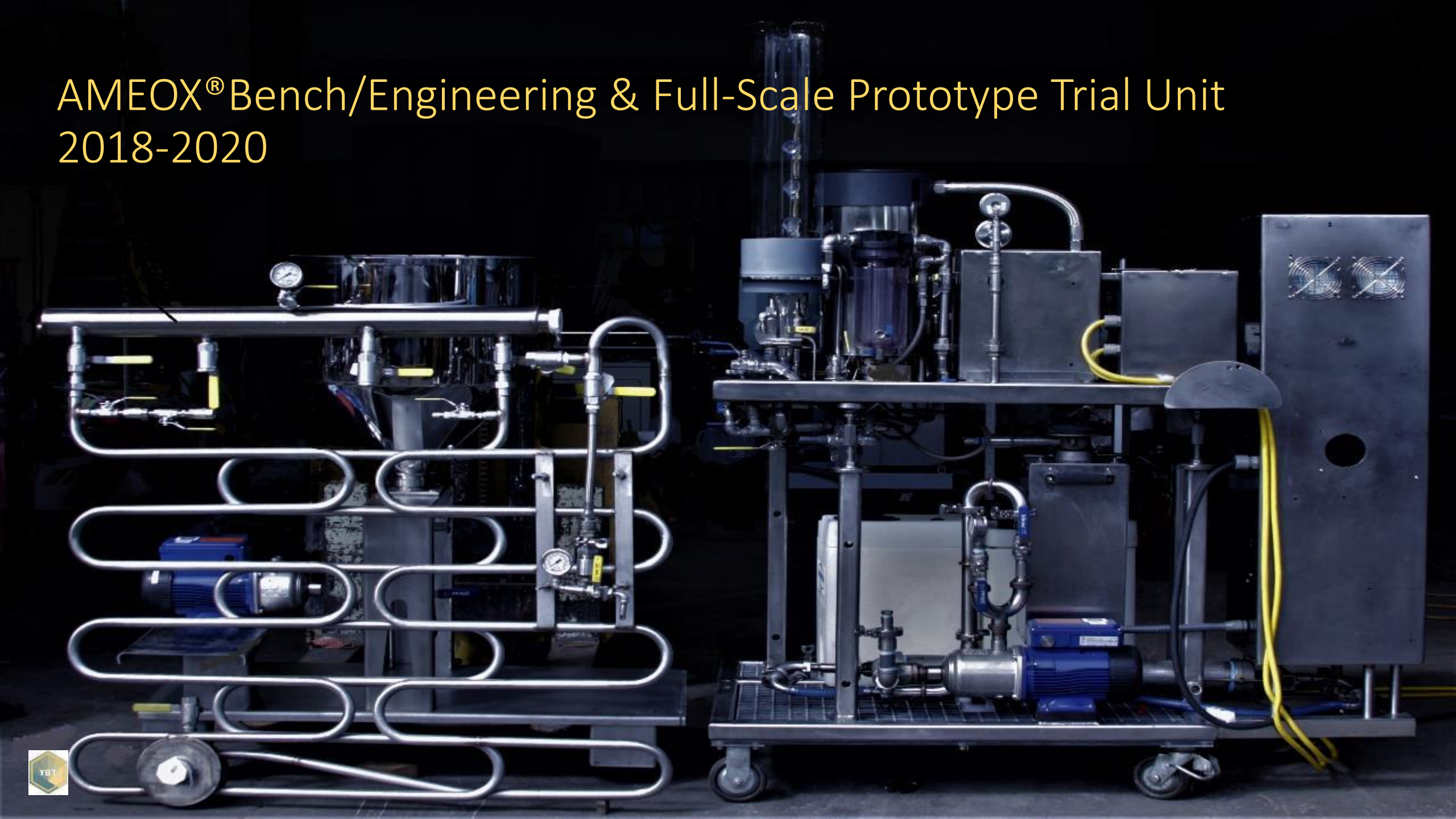
Bed-Depth Treatment Data

Industrial Waste Recovery
Wyoming, MI
July 2022

		Treatment Status:	UNTREATED	TREATED	TREATED
		Elapsed Treatment Time (Hrs.):	T = 0	17.3	17.3
		Matrix:	GAC	GAC	GAC
		1000# GAC Bed Depth Sample Location:	Vertical Composite	Top 1/2	Bottom 1/2
			TOTAL PFAS	TOTAL PFAS	TOTAL PFAS
PFAS Telomeres	Chemical Name	C Atoms	(ng/Kg - dry wt.)	(ng/Kg - dry wt.)	(ng/Kg - dry wt.)
PFBA	Perfluorobutanoic Acid	C4	**8,000**	**240**	**230**
PFPeA	Perfluoropentanoic Acid	C5	7,300	<120	<210
PFHxA	Perfluorohexanoic Acid	C6	<22,000	<120	<210
PFHpA	Perfluoroheptanoic Acid	C7	<22,000	<120	<210
PFOA	**Perfluorooctanoic Acid**	**C8**	**24,000**	**<25**	**<43**
PFNA	Perfluorononanoic Acid	C9	870	<25	<43
PFDA	Perfluorodecanoic Acid	C10	220	<120	<210
PFUnA	Perfluoroundecanoic Acid	C11	220	<120	<210
PFDoA	Perfluorododenoic Acid	C12	220	<120	<210
PFTriA	Perfluorortridecanoic Acid	C13	**220**	<120	<210
PFTeA	Perfluortetradecanoic Acid	C14	**220**	<120	<210
PFBS	Perfluorobutanesulfonic Acid	C4	**7,300**	**30**	<43
PFPeS	Perfluoropentanesulfonic Acid	C5	**2,900**	<25	<43
PFHxS	Perfluorohexanesulfonic Acid	C6	<22,000	<120	<210
PFHpS	Perfluoroheptanesulfonic Acid	C7	**5,400**	<120	<210
PFOS	**Perfluorooctanesulfonic Acid**	**C8**	**1,600,000**	**<25**	**<43**
PFNS	Perfluorononanesulfonic Acid	C9	**1,000**	<120	<210
PFDS	Perfluorodecanesulfonic Acid	C10	<44	<25	<43
FtSA 4:2	Fluorotelomer Sulfonic Acid 4:2	C6	<220	<120	<210
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	C8	**8,400**	<120	<210
FtSA 8:2	Fluorotelomer Sulfonic Acid 8:2	C10	<220	<120	<210
PFOSA	Perfluorooctanesulfonaminde	C8	<44	<25	<43
N-EtFOSSA	N-Ethylperfluorooctranesulfonic	C12	<220	<120	<210
N-MeFOSAA	N-Methylperfluorooctranesulfonice	C11	<220	<120	<210
F-53BMin	11Cl-Pf3OUds	C10	<44	<25	<43
DONA	4,8-Doxa-3H-perfluorononanoic Acid	C8	<44	<25	<43
F-53BMaj	9Cl-PF3ONS	C8	<44	<25	<210
HFPO-DA	Hexafluoropropylene	C3	<220	<120	<210
% Moisture	% Moisture		**45**	**43**	**40**
	Summation of PFOA and PFOS:		**1,624,000**	**ND**	**ND**
	Summation of PFAS Telomeres:		**1,666,270**	**270**	**230**
Lab testing by ALS, Holland, MI				>99%	>99%


AMEOX® Dual Commercial Unit in Operation
Waste Recovery Systems, Inc.
Wyoming, MI (since May 2022)
YBT

AMEOX®Bench/Engineering & Full-Scale Prototype Trial Unit 2018-2020



AMEOX®Bench-Scale Treatability Unit (2020)

On-site AMEOX® Processing (February 2024): Reverse Osmosis Reject Concentrate

RO Concentrate Treatment AMEOX System Setup

Treatment at Start

Treatment at 30 minutes

AMEOX Processing Data – Reverse Osmosis Reject Concentrate February 2024

Viability Study data shows RO-90% fluid concentrate is suitable for full-scale optimized processing via the AMEOX technology.

				AMEOX® Technology Viability Study for PFAS Destruction: Minnesota Landfill Leachate VSEP RO 90% Recovery Reject Concentrate		
			Source:			
Processed Fluid			Sample Type:	Untreated RO Reject (90%)	AMEOX Treated RO Reject (90%)	
VSEP Concentrate			Analytes:	PFAS Totals/ Metals	PFAS Totals/ Metals	
7/5/23			Matrix:	RO Concentrate Liquid	RO Concentrate Liquid	
90% Recovery			Treatability Phase:	CHARACTERIZATION	AMEOX Treated	
~20 gallons			Elapsed Hours Treated:	T = 0	T = 16	
			Sample Source:	AMEOX Reactor	AMEOX Reactor	
			Sample ID:	02092024-RO-90%	02102024-RO-90%	
			Lab:	ALS	ALS	
			Method(s):	E-537 Mod / SW3015A	E-537 Mod / SW3015A	
			Units (unless noted):	(ng/L)	(ng/L)	% Reduction
Telomere	**Chemical Name**	**CAS No.**	**C Atoms**	**Result**	**Result**	
FtSA 6:2	Fluorotelomer Sulfonic Acid 6:2	27619-97-2	C8	910	35	-96.2%
PFBS	Perfluorobutanesulfonic Acid	375-73-5	C4	6,700	3,900	-41.8%
PFBA	Perfluorobutanoic Acid	375-22-4	C4	11,000	9,000	-18.2%
PFHpA	Perfluoroheptanoic Acid	375-85-9	C7	5,900	500	-91.5%
PFHxS	Perfluorohexanesulfonic Acid	355-46-4	C6	4,200	240	-94.3%
PFHxA	Perfluorohexanoic Acid	307-24-4	C6	22,000	17,000	-22.7%
PFNA	Perfluorononanoic Acid	375-95-1	C9	270	<25	-90.7%
PFOS	Perfluorooctanesulfonic Acid	1763-23-1	C8	580	<25	-95.7%
PFOA	Perfluorooctanoic Acid	335-67-1	C8	7,500	210	-97.2%
PFPeS	Perfluoropentanesulfonic Acid	2706-91-4	C5	250	120	-52.0%
PFPeA	Perfluoropentanoic Acid	2706-90-3	C5	11,000	9,200	-16.4%
HFPO-DA	Hexafluoropropylene oxide dimer acid	13252-13-6	C6	<99	<25	
PFecHS	Perfluoro-4-ethylcyclohexanesulfonic Acid	646-83-3	C8	140	<25	-82.1%
PFBSA	Perfluorobutylsulfonamide	30334-69-1	C4	300	190	-36.7%
			Summation of PFOA and PFOS:	8,080	210	97.4%
			* Summation of PFOA, PFOS, PFNA, PFHxS, PFBS, HFPO-DA (GenX):	19,250	4,350	77.4%
			Summation of PFAS Telomere Totals:	70,750	40,437	42.8%

NOTES:

a) * March 14, 2023 - Proposed PFAS National Primary Drinking Water Regulation - (6) PFAS: https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas

b) VSEP Concentrate - 90% Recovery Landfill Leachate RO concentrate was processed February 9-10, 2024 using an AMEOX Single Unit

c) AMEOX processing followed a generic treatment regime design for PFOA + PFOS and using data provided by customer for Total PFAS of up to 10ug/L

d) Data indicate AMEOX processing conditions and RO fluid characteristics caused dissolution of metal oxide deposits accumulated on internal surfaces of AMEOX equipment from previous GAC processing.

e) PFAS cross-over contamination not evaluated. No equipment blank was tested as fluid run through system was RO concentrate (vs. clean water) and any carryover from piping surfaces would be insignificant for this viability study.

f) Viability data confirms the AMEOX technology is able to reduce the level of PFAS in 90% RO concentrate and indicates process optimization is feasible.

AMEOX® Technology Fact Sheet

- **>60-65% PFAS destruction in GAC creates effective capacity in GAC for its reuse**
- >99% destruction increases operating costs if desired.
- Electric Power Platform (240V/1-ph/50A service with propane heat)
- Robust Vortex Mixing (no motors/moving parts)
- Stainless Steel Construction
- Skid-mounted (or trailer/shipping container housing)
- <1000 to 5000-10,000+# lb. media absorber reactor processing
- Re-usable AMEOX Fluid (oxidant carrier) with no discharge
- 2 pumps w/VFD per AMEOX Single Unit system (1 hp ea.)

AMEOX® Technology Key Benefits

1) Destroys PFAS in GAC ending the PFAS cycle
2) No discharge of AMEOX fluid. Sustainably recycled
3) Low power (240V/1-ph/<50A)
4) Ambient temperature (100oF), low pressure (<80psi)
5) Carbon re-use estimate: ~7X. 4X to date for landfill leachate
6) Small 4’ x 12’ footprint. Portable or fixed site application
7) Flexibly accommodates range of GAC adsorber/reactor sizes

AMEOX® Full-scale GAC Processing Examples – Summary Table

Spent Carbon Source	Parameters	Untreated GAC (ng/Kg-dry)	AMEOX Treated GAC (ng/Kg-dry)	Destruction (%)	Comment
Groundwater Remediation	PFOA + PFOS	3,313,000	485,500	-85.3%	Full-scale commercial. Re-used for Landfill
	Total PFAS	3,343,780	513,250	-84.7%	Leachate Treatment
Landfill Leachate Treatment	PFOA + PFOS	7,547,000	788,400	-89.6%	Full-scale commercial. Treated 2nd time
	Total PFAS	7,722,337	810,430	-89.5%	after 2nd reuse. Original from groundwater remediation. Use #3 for Landfill Leachate
Mfg Plant Basement AFFF Fire-Fight Water,	PFOA + PFOS	254,200	86,500	-66.0%	Full-scale commercial. Re-used for Landfill
Detroit, MI	Total PFAS	271,513	93,716	-65.5%	Leachate Treatment
Landfill Leachate Treatment (Top 1/2 GAC)	PFOA + PFOS	1,624,000	ND	>99%	Full-scale Commercial. Re-used for Landfill
	Total PFAS	1,666,270	270	>99%	Leachate Treatment.
Landfill Leachate Treatment (Bottom 1/2 GAC)	PFOA + PFOS	1,624,000*	ND	>99%	
* Top+Bottom composited pre-treat	Total PFAS	1,666,270*	230	>99%	
AFFF Pit Water GAC	PFOA + PFOS	1,900,000	ND	97%	Full-scale Commercial
	Total PFAS	2,408,550	ND	97%	
State of MI Superfund GW Remediation Site.	PFOA + PFOS	22,937,500	6,841,000	-70.2%	Full-scale Pilot (2020)
Production Plated Plastics, Richland, MI	Total PFAS	23,249,398	6,995,500	-69.9%	
City of Ann Arbor, MI	PFOA + PFOS	104,448	6,800	-93.5%	Full-scale Pilot (2020)
DW Treatment Plant GAC, Ann Arbor, MI	Total PFAS	379,446	31,400	-91.7%	

NOTES:

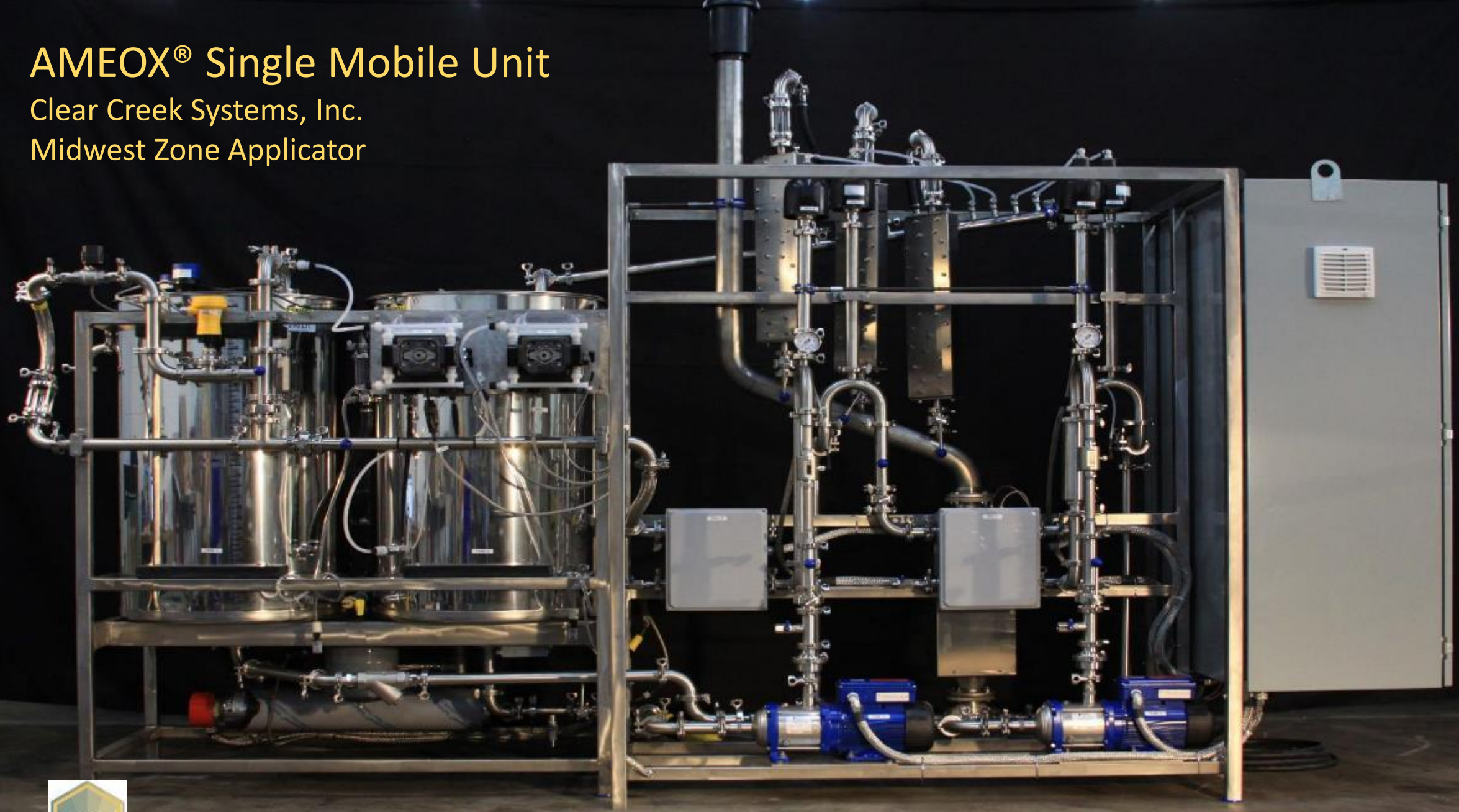
1) GAC with PFAS destruction at >65% was suitable for re-use to treat landfill leachate for sanitary discharge. Destruction to DL not necessary for re-use.
2) Iron, calcium, aluminum, manganese and alkalinity removal data not shown
3) No physical degradation of GAC due to AMEOX processing (EPS Analytical)

Analytical data by ALS Global, Holland, MI for State of MI (EGLE/MPART) PFAS Telomere List
(see individual data slides – attached)

AMEOX® Single Mobile Unit

Clear Creek Systems, Inc.

Midwest Zone Applicator



AMEOX® Single Unit Mobile Systems (Fabrication to Readiness Testing)

YB Technologies, LLC
Anacortes, WA
August 2023

AMEOX – Process Control & Cost Variables:

1. GAC Quality (Coal, Coconut/Other, Re-agglomerated, Virgin, Service, etc.)
2. Water Chemistry (treated by GAC and used for AMEOX Fluid)
3. Operating Temperature (35°F – 125°F) and Pressure Range (atmospheric to 80-85 psi)
4. Local power rates, power intensity, frequency, and modulation
5. PFAS Concentrations/Mass of GAC per Reactor Batch
6. GAC end-use/performance objectives (Reuse Reactivation, Internment, Subsequent Processing)
7. 3-5^{+}-yr AMEOX Equipment Life Expectancy (w/pumps @ 2-3 years with servicing)

GAC characterization data and process objectives required for cost estimate

AMEOX® Destruction of PFAS

Alternative Application Potentials

YB Technologies – Anacortes, WA

AMEOX Technology Application Potential

Alternate Adsorption/Absorption Media

- Ion Exchange Resin
- Organoclay
- Other

Issues/Concerns:

- Media structural stability?
- Base material type?
- PFAS destruction?
- Disposal or Re-use?

AMEOX Technology Application Potential

AFFF Fire Suppression System Retrofits

On-site/In-Line PFAS Destruction


DO NOT REMOVE
COVER WITHOUT
DISCONNECTING

QUESTIONS?

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