

Creating local PFAS legislation

Antea Group

Drawing up local policy for the re-use of soils

Understanding today. Improving tomorrow.



www.anteagroup.com

10 March 2021

Introduction

- Ivar Lanting
 - Senior advisor at Antea Group



- Over 20 years of experience as an environmental advisor
- Experience with local governments such as municipalities, regional water authorities and industries



Year Countries Regulated PFAS







Overview presentation



- Reason for investigation into PFAS
- The Dutch standard guidelines for soil lead to huge problems
- Temporary action framework (Tijdelijk Handelingskader)
- Indicative levels for serious contamination
- Creating local PFAS policies (case study PFAS soil quality map Brabant)
 - Define sub-areas
 - Define background values of PFAS of the sub-area
 - Define outliers
 - Presenting results
 - Create local PFAS soil re-use policy















Soil legislation



- Overall guideline in the Netherlands is the standstill principle;
 - In the Netherlands a soil survey is necessary if soil is reused outside the development location
 - An historical soil research has to determine if (extra) soil investigation is necessary
 - quality for Soil re-use

Background valueQuality living/housingQuality industryNot applicablePFAS Quality housing and industry



Non-standard substances



- For non-standard substances, the detection limit applies for soil and groundwater;
- The detection limit for PFAS in soil is 0,1 μg/kg; the detection limit for ground water and surface water is 0,5 ηg/l -0,1 μg/l

Sources for atmospheric deposition of PFAS



- Industry (among others: carpet / fabric, paper industry)
- Waste incineration plants



• Global sea spray







Issues caused by PFAS in the Netherlands



- Standstill transport & soil re-use
- Standstill dredging
 - High research costs for PFAS;
 - Difficult to find a location to reuse soil with PFAS.
- Government calls for insight into background values of PFAS





Temporary action framework



Background valueQuality living/housing Quality industryNot applicablePFAS Quality housing and industry

- In temporary framework of July 2019 PFAS concentration up to 0,8 μg/kg, for PFOA 0,9 μg/kg, in soil or sludge are freely applicable. Soil with a higher concentration can be applied under conditions up to a maximum concentration of 3 μg/kg for PFAS and 7 μg/kg for PFOA;
- In the temporary framework of July 2020 PFAS concentrations up to 1,4 μ g/kg, for PFOA 1,9 μ g/kg, in soil or sludge are freely applicable. Soil with higher concentrations can be applied under conditions to a maximum concentration of 3 μ g/kg for PFAS and 7 μ g/kg for PFOA.

In February 2021 the RIVM accepted the EFSA assessment tolerable intake and risks.



Advieslijst te meten PFAS National Institute for Health and Environment

Datum: 12 juli 2019

#	Compound	Acronym	Formula	SIKB-code	SIKB/Aquo co	CAS-nr
1	perfluoro-n-butanoic acid	PFBA	C4HF7O2	4437	PFBA	375-22-4
2	perfluoro-n-pentanoic acid	PFPeA	C5HF9O2	4448	PFPA	2706-90-3
3	perfluoro-n-hexanoic acid	PFHxA	C6HF1102	4441	PFHxA	307-24-4
4	perfluoro-n-heptanoic acid	PFHpA	C7HF1302	4440	PFHpA	375-85-9
5	perfluoro-n-octanoic acid(lineair) (1)	PFOA	C8HF1502	4443	PFOA	335-67-1
6	perfluoro-n-octanoic acid(branched)(1)	PFOAvertakt	-	5577	sverttPFOA	NVT
7	perfluoro-n-nonanoic acid	PFNA	C9HF1702	4442	PFNA	375-95-1
8	perfluoro-n-decanoic acid	PFDA	C10HF19O2	4438	PFDA	335-76-2
9	perfluoro-n-undecanoic acid	PFUnDA	C11HF21O2	4451	PFUdA	2058-94-8
10	perfluoro-n-dodecanoic acid	PFDoA	C12HF23O2	4439	PFDoA	307-55-1
11	perfluoro-n-tridecanoic acid	PFTrDA	C13HF25O2	4449	PFTDA	72629-94-8
12	perfluoro-n-tetradecanoic acid	PFTeDA	C14HF27O2	4450	PFTeDA	376-06-7
13	perfluoro-n-hexadecanoic acid	PFHxDA	C16HF31O2	5735	PFC16azr	67905-19-5
14	perfluoro-n-octadecanoic acid	PFODA	C18HF35O2	5736	PFC18azr	16517-11-6
15	perfluoro-1-butane sulfonic acid	PFBS	C4HF9O3S	3895	L_PFBS	375-73-5
16	perfluoro-1-pentane sulfonic acid	PFPeS	C5HF1103S	5935	PFC5asfzr	2706-91-4
17	perfluoro-1-hexane sulfonic acid	PFHxS	C6HF1303S	3932	L_PFHxS	355-46-4
18	perfluoro-1-heptane sulfonic acid	PFHpS	C7HF1503S	3931	L_PFHpS	375-92-8
19	perfluoro-1-octane sulfonic acid (lineair)(1)	PFOS	C8HF1703S	4445	PFOS	1763-23-1
20	perfluoro-1-octane sulfonic acid (branched)(1)	PFOSvertakt	-	5518	sverttPFOS	NVT
21	perfluoro-1-decane sulfonic acid	PFDS	C10HF2103S	3898	L_PFDS	335-77-3
22	4:2 fluorotelomer sulfonic acid	4:2 FTS	C6H5F9O3S	5996	H-PFC6asfzr	757124-72-4
23	6:2 fluorotelomer sulfonc acid	6:2 FTS	C8H5F13O3S	5517	2PFC6yC2a1s	27619-97-2
24	8:2 fluorotelomer sulfonic acid	8:2 FTS	C10H5F17O3S	5830	H-PFC10asfzr	39108-34-4
25	10:2 fluorotelomer sulfonic acid	10:2 FTS	C12H5F21O3S	5831	H-PFC12asfzr	120226-60-0
26	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	C11H6F17NO4S	5937	N-MeFOSAA	2355-31-9
27	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	C12H8F17NO4S	5744	EtFOSAA	2991-50-6
28	perfluoro-1-octanesulfonamide	PFOSA	C8H2F17NO2S	4446	PFOSA	754-91-6
29	N-methylperfluorooctanesulfonamide	N-MeFOSA	C9H4F17NO2S	6001	MeFOSA	31506-32-8
30	8:2 polyfluoroalkyl phosphate diester	8:2 diPAP	C20H9F34O4P	5998	bisPFC10yPO4	678-41-1



voetnoot 1 De vertakte verbindingen worden door het laboratorium als som gerapporteerd, de lineaire verbindingen apart.

De totale som (vertakt plus lineair) voor PFOS of PFOA wordt alleen gebruikt voor toetsing aan de norm 3,0 voor PFOS ei Sommatie vindt plaats volgens bijlage GIV van de Regeling bodemkwaliteit (< waarden *0,7)



		HFPO-DA /				
"GenX"	Hexafluoropropyleneoxide dimer acid	FRD-903	C6HF11O3	5741	FRD-903	13252-13-6

Indicative levels for serious contamination

Compound							
	Soil µg/kg	Groundwater μg/l	Groundwater μg/l				
		Incl. drinking water	Excl. drinking water				
PFOS	110	0,2	56				
PFOA	1100	0,39	170				
GenX	97	0,66	140				

The INEV's determine whether an existing, local contamination must (possibly) be remediated

INEV's are threshold values to determine serious cases of soil contamination



Drawing up local PFAS policy



- The spatial unit is subdivided, based on (the suspicion) of the occurrence of PFAS;
- The background value of the sub-zones is calculated;
- When a corresponding quality is determined, zones are merged.
- PFAS policy for soil re-use is drawn up.



Sub-areas PFAS soil quality map



anteagroup



Steps to determine quality



- Determining PFAS suspicious activities (delete locations by using buffer);
- Make a distinction between the topsoil and subsoil;
- Make use of existing data;
- Check for spatial distribution within the sub-area;
- Check whether the minimum number of measuring points is met (30 for the topsoil and 30 for subsoil);
- Gather data by soil sampling.



Determine outliers







				-												
stof	n	P5	P50	P80	P90	P95	max.	gem.	std. dev.	varco.	px.80+	px.80-	achtergrond- waarde	maximale waarde wonen	maximale waarde industrie	heterogenitei t
perfluoroctaanzuur (PFOA lin.)	34	0,07	0,45	0,80	1,21	1,43	2,40	0,55	0,51	1,07	0,57	0,53	1,9	7	7	0,27
perfluoroctaansulfonaat (PFOS lin.)	34	0,09	0,50	0,90	1,76	2,10	3,80	0,70	0,78	0,90	0,73	0,67	1,4	3	3	1,26
perfluoroctaanzuur (PFOA ver.)	30	0,07	0,07	0,07	0,07	0,10	0,30	0,08	0,04	1,85	0,08	0,08	1,9	7	7	0,01
perfluoroctaansulfonaat (PFOS ver.)	30	0,07	0,07	0,20	0,37	0,58	0,80	0,16	0	0,89	0,17	0,16	1,4	3	3	0,32
som lineair en vertakt perfluoroctaanzuur	30	0,14	0,58	0,92	1,31	1,53	2,50	0,66	1	1,26	0,68	0,64	1,9	7	7	0,27
som lineair en vertakt perfluoroctylsulfonaat	30	0,15	0,58	1,02	2,21	2,65	4,60	0,88	1	0,91	0,93	0,84	1,4	3	3	1,56
perfluor-1-butaansulfonaat (lineair)	34	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,00	7,24E+15	0,07	0,07	1,4	3	3	0,00
perfluor-1-decaansulfonaat (lineair)	34	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0	7,24E+15	0,07	0,07	1,4	3	3	0,00
perfluor-1-heptaansulfonaat (lineair)	34	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,00	7,24E+15	0,07	0,07	1,4	3	3	0.00
perfluor-1-hexaansulfonaat (lineair)	34	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0	7,24E+15	0,07	0,07	1,4	3	3	0.00
perfluorbutaanzuur	34	0,07	0,10	0,20	0,20	0,22	0,50	0,13	0,09	1,50	0,14	0,13	1,4	3	3	0,09
perfluordecaanzuur	34	0,07	0,07	0,07	0,09	0,13	0,60	0,09	0	0,98	0,09	0,09	1,4	3	3	0.04
perfluordodecaanzuur	34	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0	7,24E+15	0,07	0,07	1,4	3	3	0.00
perfluorheptaanzuur	35	0,07	0,07	0,07	0,09	0,15	0,20	0,08	0,03	2,50	0,08	0,08	1,4	3	3	0,05
perfluorhexaanzuur	34	0,07	0,07	0,07	0,10	0,20	1,40	0,12	0	0,52	0,13	0,11	1,4	3	3	0.08
perfluornonaanzuur	34	0,07	0,07	0,07	0,10	0,31	1,60	0,14	0	0,49	0,15	0,13	1,4	3	3	0,15
perfluoroctaansulfonamide	34	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0	7,24E+15	0,07	0,07	1,4	3	3	0.00
	1			1												1
Legenda														Toelichting		
Kolommen								<u>kwaliteitski</u>	assen					Gehalten zijn gera	pporteerd in µg/kg	
stof	naam van de	stof						Kleur	Ondergren	n Bovengre	ei Omschrijv	ving				
n	aantal waarn	emingen								<= AW	Achtergrone	d <u>W</u> aarde ^{ra}				
P50	50e percentie	el							> AV	<= Wo	<u>Wo</u> nen ⁽²⁾					
P80	80e percentie	el							> Vo	<= Ind	Industrie ⁽²⁾			1 Kwaliteitsoord	eel op basis van het j	gemiddelde gehalte
P90	90e percentie	el							> Ind		Niet toepasbaar			2. Conform Regeling bodemkwaliteit'		<i>.</i> .
P95	95e percentie	el												3 Conform Gro	ndverzet met bodem	kwaliteitskaarten '
max.	maximum													(Deltares, 2011)	7	
gem.	gemiddelde							<u>heterogenit</u>	teitsklassen (*4	Ð						
std. dev.	standaardde	viatie						Kleur	Ondergren	n Bovengre	ei Omschrijv	ving				
varco.	variatiecoëff	iciënt							>= 0,00	<= 0,20	weinig heter	ogeniteit				
px.80+	bovengrens	betrouwbaarł	heidsinterval v	van 80% rond i	net gemiddeld	le			> 0,20	<= 0,50	beperkte he	terogeniteit				
px.80-	ondergrens b	petrouwbaarh	eidsinterval v	an 80% rond h	et gemiddeld	e			> 0,50	<= 0,70	heterogenite	eit				
achtergrondwaarde	achtergrondv	waarde ^{rei}							> 0,70		sterke heter	ogeniteit				
wonen	maximale wa	arde kwaliteit	tsklasse wone	en ^{rei}												

Application map for PFAS containing soil including the locations of water abstraction areas





Understanding today. Improving tomorrow.

anteagroup











Courtesy of Dr. Guelfo, Brown University 10-7-2016

Understanding today. Improving tomorrow. Antea USA, Inc. 21