

**Emission estimates for diffuse sources
Netherlands Emission Inventory**

**Leaching of preserved wood
in bank revetments**

Version dated June 2008

NETHERLANDS NATIONAL WATER BOARD WATER UNIT
in cooperation with DELTARES and TNO

Leaching of preserved wood in bank revetments

1 Description of emission source

Emissions from preserved wood in hydraulic bank revetments originate from two types of preserved wood, specifically wood treated with Wolman's salt and wood treated with creosote. Wolman's salts can cause emissions of arsenic, chromium and copper. Creosote preserved wood is a source of emissions of polycyclic aromatic hydrocarbons (PAH). Apart from bank revetments, preserved wood is also used for other construction applications such as playgrounds, but emissions from preserved wood in these applications do not enter water, and consequently are not covered in this fact sheet. Emissions from wood treated with Wolman's salt are allocated to the governmental target sector "Trade and services". Emissions from creosote treated wood are assigned to governmental target sector "Transport", because this wood is largely used to enable inland navigation.

2 Explanation of calculation method

Emissions are calculated for each substance by multiplying an activity rate (AR), in this case the quantity of preserved wood, by an emission factor (EF) expressed in kg of the specific substance per m² of preserved wood. This method of calculation is explained in the Handreiking Regionale aanpak diffuse bronnen [1]. For creosote treated wood, this is calculated using the following equation.

$$\text{Emission} = AR_1 \times EF_1 + \sum (AR)_s + EF_s$$

Where:

- AR₁ = Creosote treated wood (added last year) (m²), or
- EF₁ = Emission factor creosote treated wood added last year (kg/m²)
- AR_s = Creosote treated wood (standing from previous years) (m²)
- EF_s = Emission factor creosote treated wood standing from previous years (kg/m²)

Here a distinction is made between new application of creosote treated wood and standing quantities of creosote treated wood. "New application" refers to the amount of wood placed in the past year. "Standing" creosote treated wood refers to the amount of creosote treated wood placed in previous years and which is still a source of emissions.

For wood treated with Wolman's salt, the emissions caused by standing wood from past years is calculated and totalled separately, as with the following formula:

$$\text{Emission} = \sum (AR_j * EF_j)$$

Where:

- AR_j = Amount of wood treated with Wolman's salt placed in year J (m³)
- EF_j = Emission factor for wood treated with Wolman's salt placed in year J (kg/m³)

The emission calculated in this way is referred to as the total emission.

3 Activity rates

The AR is the amount of preserved wood in bank revetments. The activity rates for creosote treated wood and wood treated with Wolman's salt are determined by different methods.

Creosote treated wood

For creosote treated wood, the assumption is that the emissions in the first year are higher than those in the years thereafter. This is why there are separate calculations for the new application (placed in the past year) and the standing (placed in previous years) wood.

Table 1 shows the activity rates for creosote treated wood. These figures are determined in the following manner:

- The new application in 1985 and 1992 is determined by Hulskotte [2]. The quantities in 1990, 1995 and 2000 are interpolated. From 2001 on, no new creosote treated wood was placed, pursuant to the governmental regulation called PAK-besluit [3].
- The standing wood in 1992 is calculated by multiplying the new application from 1980 (500,000 m²) by the lifetime (25 years) minus 10 years and then adding the new application of 1992 (250,000 m²) times 10 years [2]. Because we do not count the new application from the last year with the standing wood, we subtract the 1992 figure for new application from the standing wood calculated. This results in a figure of 9,750,000 m² for standing wood 1992. This figure is used for the further calculation of the standing wood in the other years. Figures for standing wood in other years is calculated in the same manner:

$$\text{Standing Wood}_{\text{reporting year}} = \text{Standing Wood}_{1992} - a * \text{New App}_{1980} + \text{New App}_{1992 - \text{reporting year}}$$

Where:

$$\text{Standing Wood}_{\text{reporting year}} = \text{Standing Wood in 1985, 1990, 1995, 2000, 2004 or 2005, (m}^2\text{)}$$

$$\text{Standing Wood}_{1992} = \text{Standing Wood in 1992, (9,750,000 m}^2\text{)}$$

$$a = \text{Number of years between reporting year and 1992}$$

$$\text{New App}_{1980} = \text{New Application in 1980, (500,000 m}^2\text{)}$$

$$\text{New App}_{1992 - \text{reporting year}} = \text{Sum of the new application in the years 1992 until reporting year, (m}^2\text{)}$$

Table 1: Quantity of creosote treated wood in bank revetments (m²)

	1985	1990	1995	2000	2005	2006
New application	400,000	300,000	62,500	10,000	0	0
Standing	11,800,000	10,250,000	8,800,000	6,502,500	4,002,500	3,502,500

Wood treated with Wolman's salt

Calculating the emissions by wood treated with wolman salt requires knowing how much wood was placed in previous years. These quantities are shown in table 2. Because the emission factor decreases as the wood ages, counting up the total amount of standing wood will not lead to a correct result. Instead, the emission per year of new application must be determined.

Wood treated with Wolman's salt has only been used in bank revetments since 1979. In the years prior to that, creosote treated wood was most commonly used. For the years before 1979, the amount of wolman treated wood placed is set at 0 m³. Its lifetime is set at 40 years [4]. Consequently, this calculation assumes that all wood treated with wolman salt ever placed is still present. From 2001 on, no new wood treated with wolman salt was used in bank revetments, because no further WVO permits (permits under the Act on Water Pollution) were issued for the product after that time.

Table 2: Amount of wood treated with wolman salt placed in bank revetments in previous years (1000 m³), based on [4].

	1985	1990	1995	2000	2005	2006
Year of new application						
1979	21.6	21.6	21.6	21.6	21.6	21.6
1980	22.0	22.0	22.0	22.0	22.0	22.0
1981	22.4	22.4	22.4	22.4	22.4	22.4
1982	22.8	22.8	22.8	22.8	22.8	22.8
1983	23.2	23.2	23.2	23.2	23.2	23.2
1984	23.6	23.6	23.6	23.6	23.6	23.6
1985	24.0	24.0	24.0	24.0	24.0	24.0
1986		36.8	36.8	36.8	36.8	36.8
1987		49.6	49.6	49.6	49.6	49.6
1988		57.1	57.1	57.1	57.1	57.1
1989		64.7	64.7	64.7	64.7	64.7
1990		75.6	75.6	75.6	75.6	75.6
1991			86.5	86.5	86.5	86.5
1992			97.4	97.4	97.4	97.4
1993			108.3	108.3	108.3	108.3
1994			103.8	103.8	103.8	103.8
1995			99.1	99.1	99.1	99.1
1996				94.4	94.4	94.4
1997				89.7	89.7	89.7
1998				85.0	85.0	85.0
1999				56.7	56.7	56.7
2000				28.3	28.3	28.3
2001					0	0
2002					0	0
2003					0	0
2004					0	0
2005					0	0
2006						0

4 Emission factors

The emission factor is the emission per quantity of preserved wood in bank revetments. The emission factors for creosote treated and wood treated with wolman salt are determined by different methods.

Creosote treated wood

For creosote treated wood, emission factors are formulated to be higher in the first year than in the years thereafter. This is why different emission factors are used for the new application of creosote treated wood and standing creosote treated wood. First, the emission factor for fluoranthene is determined. The emission factors for other substances are determined using a substance profile at leaching of the PAH.

- For new application of creosote treated wood, the emission factor for fluoranthene is calculated using the following assumptions:
Emission is highest for the first 31 days. For pine wood, the assumed emission factor is $4.0 \cdot 10^{-6}$ kg fluoranthene/m²/day, and for fir, the assumed emission factor is $1.9 \cdot 10^{-6}$ kg fluoranthene/m²/day [5]. For days 32-365 of the first year, the assumed emission factor is $0.9 \cdot 10^{-6}$ kg fluoranthene/m²/day for both woods [5]. Additionally, it is assumed that pine makes up approximately 75% of the wood used, with 25% being fir [6]. When combined, this information results in an emission factor of $4.1 \cdot 10^{-4}$ kg fluoranthene/m²/year.
- For calculating the emission factor for fluoranthene for standing creosote treated wood, the assumption is that this emission factor is the same as the emission factor for days 32-365 in the first year. This is an emission factor of $0.9 \cdot 10^{-6}$ kg fluoranthene/m²/day for both woods [5]. This results in an emission factor of $3.3 \cdot 10^{-4}$ kg fluoranthene/m²/year.

The emission factors for phenanthrene, anthracene and pyrene are determined using data from a report by TNO [7]. This report presents the substance profile in the leaching fluids from two reports [5, 8]. Based on the substance profile, we estimate the ratios at leaching for phenanthrene, anthracene, fluoranthene and pyrene at 65%, 5%, 15% and 15%. The emission factor for naphthalene is taken from [9], in which the quantity of naphthalene is equal to the quantity of phenanthrene. This is why the same emission factor is used for these two substances.

Table 3: Emission factors for PAH-compounds from creosote treated wood, (10^{-3} kg/m²) [5].

	New application	Standing
Phenanthrene	1.78	1.43
Anthracene	0.14	0.11
Fluoranthene	0.41	0.33
Pyrene	0.41	0.33
Naphthalene	1.78	1.43

Wood treated with wolman salt

The emission factors for wood treated with wolman salt depend on the type of preservative compound used to treat the wood and the leaching over the lifetime of the wood. Appendix 1 shows the details of the calculation of the emission factors. Tables 4-6 show the emission factors for arsenic, chromium and copper, depending on the year of placement of the wood.

Table 4: Emission factors for arsenic from wood treated with wolman salt based on [4], (10^{-3} kg/m³)

	1985	1990	1995	2000	2005	2006
Year of new application						
1979	8.19	7.61	7.15	6.83	6.44	6.44
1980	8.11	7.48	7.04	6.66	6.28	6.22
1981	7.95	7.28	6.86	6.49	6.13	6.07
1982	7.90	7.14	6.67	6.32	5.97	5.91
1983	7.83	6.99	6.53	6.14	5.80	5.75
1984	7.85	6.83	6.34	5.96	5.69	5.58
1985	8.37	6.71	6.19	5.82	5.51	5.46
1986		6.81	6.24	5.88	5.56	5.51
1987		7.02	6.34	5.93	5.62	5.56
1988		7.23	6.45	6.03	5.67	5.62
1989		7.54	6.55	6.08	5.72	5.67
1990		4.51	3.61	3.33	3.14	3.08
1991			3.67	3.36	3.16	3.14
1992			3.78	3.42	3.19	3.16
1993			3.89	3.47	3.25	3.19
1994			3.05	2.65	2.46	2.44
1995			3.10	2.48	2.29	2.25
1996				2.29	2.10	2.08
1997				2.13	1.92	1.89
1998				1.95	1.74	1.71
1999				1.69	1.47	1.45
2000				1.50	1.20	1.18
2001					0	0
2002					0	0
2003					0	0
2004					0	0
2005					0	0
2006						0

Table 5: Emission factors for chromium from wood treated with wolman salt based on [4], (10^{-3} kg/m³)

	1985	1990	1995	2000	2005	2006
Year of new application						
1979	0.200	0	0	0	0	0
1980	0.202	0	0	0	0	0
1981	0.204	0	0	0	0	0
1982	0.206	0	0	0	0	0
1983	0.208	0.208	0	0	0	0
1984	0.420	0.210	0	0	0	0
1985	1.855	0.212	0	0	0	0
1986		0.212	0	0	0	0
1987		0.212	0	0	0	0
1988		0.212	0.212	0	0	0
1989		0.424	0.212	0	0	0
1990		2.065	0.236	0	0	0
1991			0.236	0	0	0
1992			0.236	0.000	0	0
1993			0.236	0.236	0	0
1994			0.432	0.216	0	0
1995			1.523	0.218	0	0
1996				0.219	0	0
1997				0.221	0	0
1998				0.222	0.222	0
1999				0.431	0.215	0.215
2000				1.461	0.209	0.209
2001					0	0
2002					0	0
2003					0	0
2004					0	0
2005					0	0
2006						0

Table 6: Emission factors for copper from wood treated with wolman salt (10^{-3} kg/m³) based on [4].

	1985	1990	1995	2000	2005	2006
Year of new application						
1979	2.00	1.20	0.80	0.60	0.40	0.40
1980	2.20	1.40	0.80	0.60	0.40	0.40
1981	2.40	1.40	1.00	0.60	0.40	0.40
1982	2.60	1.60	1.00	0.60	0.40	0.40
1983	2.80	1.80	1.20	0.80	0.60	0.40
1984	3.40	2.00	1.20	0.80	0.60	0.60
1985	22.00	2.20	1.40	0.80	0.60	0.60
1986		2.40	1.40	1.00	0.60	0.60
1987		2.60	1.60	1.00	0.60	0.60
1988		2.80	1.80	1.20	0.80	0.60
1989		3.40	2.00	1.20	0.80	0.80
1990		17.60	1.76	1.12	0.64	0.64
1991			1.92	1.12	0.80	0.64
1992			2.08	1.28	0.80	0.80
1993			2.24	1.44	0.96	0.80
1994			2.55	1.50	0.90	0.90
1995			5.17	1.81	1.13	0.97
1996				2.02	1.15	1.15
1997				2.24	1.34	1.17
1998				2.50	1.53	1.36
1999				3.20	1.71	1.53
2000				6.39	1.90	1.71
2001					0	0
2002					0	0

2003					0	0
2004					0	0
2005					0	0
2006						0

5 Effects of policy measures

Until 1989, treatment compound CCA type B was used. In 1990, this was replaced by preservative type C [4] (see appendix 1). Preservative CCA type C contains less arsenic than CCA type B. The replacement of Type B with Type C resulted in an emission reduction of arsenic.

From 2001 on, no new creosote treated wood was placed, pursuant to the governmental regulation called PAK-besluit [3]. Likewise, from 2001 on no new wood treated with wolman salt was used in bank revetments, because no further WVO permits (permits under the Act on Water Pollution) were issued for the product after that time. Application of preserved wood in, along or above water is obliged to obtain a WVO permit. One consideration in any permitting procedure is that creosote treated wood and wood treated with wolman salt are a source of environmental problems even though alternatives are available. Consequently, these wood preservatives are no longer be allowed in bank revetments. From 2001 on, only emission occurs from preserved wood that was placed prior to that year.

6 Emissions calculated

The tables 7 and 8 show the calculated total emissions.

Table 7: Emissions from creosote treated wood, (kg)

		1985	1990	1995	2000	2005	2006
Phenanthrene	New application	712	534	111	17,8	0	0
	Standing	16,874	14,658	12,584	9,299	5,724	5,009
Anthracene	New application	56	42	8,8	1,4	0	0
	Standing	1,298	1,128	968	715	440	385
Fluoranthene	New application	164	123	25,6	4,1	0	0
	Standing	3,894	3,383	2,904	2,146	1,321	1,156
Pyrene	New application	164	123	25,6	4,1	0	0
	Standing	3,894	3,383	2,904	2,146	1,321	1,156
Naphthalene	New application	712	534	111	17,8	0	0
	Standing	16,874	14,658	12,584	9,299	5,724	5,009

Table 8: Emissions from wood treated with wolman salt (kg)

	1985	1990	1995	2000	2005	2006
Arsenic	1,281	2,978	4,403	4,737	4,419	4,369
Chromium	77	229	308	195	37	18
Copper	878	2,193	2,053	2,106	1,242	1,133

7 Release into environmental compartments

The assumption for wood treated with wolman salt is that all emissions go directly to surface water [4]. For creosote treated wood, the assumption is that half of the wood comes into direct contact with water, and consequently that half of the emissions go to the soil and half to the surface water [5]. This produces the emissions to soil and water as shown in tables 9 and 10, below.

Table 9: Emissions to water (kg)

	1985	1990	1995	2000	2005	2006
Phenanthrene	8,793	7,596	6,348	4,658	2,862	2,504
Anthracene	677	585	488	358	220	193
Fluoranthene	2,029	1,753	1,465	1,075	743	660
Pyrene	2,029	1,753	1,465	1,075	660	578
Naphthalene	8,793	7,596	6,348	4,658	2,862	2,504
Arsenic	1,281	2,978	4,403	4,737	4,419	4,369
Chromium	77	229	308	195	37	18
Copper	878	2,193	2,053	2,106	1,242	1,133

Table 10: Emissions to soil (kg)

	1985	1990	1995	2000	2005	2006
Phenanthrene	8,793	7,596	6,348	4,658	2,862	2,504
Anthracene	677	585	488	358	220	193
Fluoranthene	2,029	1,753	1,465	1,075	743	660
Pyrene	2,029	1,753	1,465	1,075	660	578
Naphthalene	8,793	7,596	6,348	4,658	2,862	2,504

8 Description of emission pathways to water

The emissions calculated here are direct emissions into water.

9 Spatial allocation

The spatial allocation of emissions is assigned on the basis of a set of digital maps held by the Netherlands Environmental Assessment Agency (PBL) drawn up using emission records. These maps present the spatial distribution of all kinds of parameters throughout the Netherlands, such as population density, traffic intensity, area of agricultural crops, etc. For the purposes of emission registration these maps are used as 'locators' to determine the spatial distribution of emissions. The range of possible locators is limited (see [10] for a list of available locators), as not every conceivable parameter can be used as a locator. In practice the locator to be the best proxy of the activity rate of the emission in question is applied for the distribution of emissions.

It is assumed that the distribution of emissions throughout the country is proportional to the national distribution of the locator.

The table below shows the locator used for the spatial allocation of the various emission sources.

Table 11: Locators for spatial allocation

	Locators
Preserved wood, bank revetments	Length of banks

The method used to determine the locators is described in [10]:

Length of banks

The bank length of surface waters is determined per grid cell measuring 500*500 metres. This is done by selecting the surface water from the topographical map and generating an overlay with the 500*500m grid map, according to which the total length of the banks is added up per grid cell. The distribution is used for emissions from creosote treated wood and wood treated with wolman salt used in shore protection. The data dates back to the end of the 1990s.

10 Comments and changes in regard to previous version

In 2008 a number of substances was added to calculations of emissions from creosote treated wood. Next to fluoranthene; phenanthrene, anthracene, pyrene and naphthalene were included.

11 Accuracy and indicated subjects for improvement

The method used in Emission Inventory publications has been followed as far as possible in classifying the quality of information [11]. It is based on the CORINAIR (CORe emission INventories AIR) methodology, which applies the following quality classifications: CORINAIR uses the following quality classifications:

- A: a value based on a large number of measurements from representative sources;
- B: a value based on a number of measurements from some of the sources that are representative of the sector;
- C: a value based on a limited number of measurements, together with estimates based on technical knowledge of the process;
- D: a value based on a small number of measurements, together with estimates based on assumptions;
- E: a value based on a technical calculation on the basis of a number of assumptions.

The activity rates for creosote treated wood and wood treated with wolman salt are both based on extrapolation of estimates. This is assigned a classification of D. The emission factors are determined using measurements supplemented with assumptions and estimates. This is assigned a classification of C (for creosote treated and wood treated with wolman salt).

The distribution across the compartments differs for wood treated with wolman salt and creosote treated wood. All emissions of wood treated with wolman salt go to water, while emissions from creosote treated wood are split evenly between the water and the soil. In both cases, this is an estimate, and this is assigned a classification of D. The emission pathways to water are assigned a classification of A. Spatial allocation based on bank length is uncertain, and so is assigned a classification of D.

Element of emission calculation	Reliability class
Activity rates	D
Emission factors	C
Distribution among compartments	D
Emission pathways to water	A
Spatial allocation	D

The most significant areas for improvement are:

- The distribution of emissions over environmental compartments is uncertain. Different distributions are used for wood treated with wolman salt and creosote treated wood, even though both come into contact with both soil and water. In addition, the emission factors for the wood in contact with the soil and with the water will be different.
- Emissions from wood treated with wolman salt are assigned to the governmental target sector "Trade and Services", while emissions from creosote treated wood are assigned to the governmental target sector "Transport". The same target sector could be used for both emission sources.

12 Request for reactions

Any questions or comments on this working document should be addressed to: Richard van Hoorn, Centre for Water Management, +31 (0)320-298491, email richard.van.hoorn@rws.nl or Joost van den Roovaart, Deltares, +31 (0)6-57315874, email joost.vandenroovaart@deltares.nl.

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Appendix 1. Calculation of emission factor for wood treated with wolman salt

The calculation is performed by computing emission factors for the various preservatives and totalling these emission factors.

$$EF_{S,R} = \sum_V (\text{Composition}_{S,V,J} * \text{Use percentage}_{V,J} * \text{Leaching}_{S,V,R,J})$$

Where:

Composition_{S,V,J} = Amount of substance S in preservative V, placed in year J

Use percentage_{V,J} = Amount of wood placed in year J with preservative V

Leaching_{S,V,R,J} = Leaching of substance S in reporting year R by wood with preservative V, placed in year J

The leaching depends on the type of preservative, the substance and any fixer used. The process of fixing the preservative began in 1992, and fixer was used on a large scale by 1995 [4]. The assumption made is that fixing was not done prior to 1995, and that from 1995 all preserved wood was fixed.

Table B1.1: Composition of preservatives, (kg/m³)

Preservative	Cu	Cr	As
CCA type B	1	1.4	1.3
CCA type C	1	2	0.7
CC	1	1.3	
C	0.4		

Based on [4]

Until 1989, treatment compound CCA type B was used. In 1990, this was replaced by preservative type C [4]. The abbreviations CCA, CC and C refer to the substances in the preservative (Cu, Cr and As).

Table B1.2: Use percentage for wood placed in individual years, for preservatives CCA, CC and C

Year	CCA wood	CC wood	C wood
1979	50%	50%	0%
1980	48%	52%	0%
1981	47%	53%	0%
1982	45%	55%	0%
1983	43%	57%	0%
1984	42%	58%	0%
1985	40%	60%	0%
1986	40%	60%	0%
1987	40%	60%	0%
1988	40%	60%	0%
1989	40%	60%	0%
1990	40%	60%	0%
1991	40%	60%	0%
1992	40%	60%	0%
1993	40%	60%	0%
1994	30%	60%	10%
1995	28%	63%	10%
1996	25%	65%	10%
1997	23%	68%	10%
1998	20%	70%	10%
1999	17%	70%	13%
2000	13%	70%	17%
2001	10%	70%	20%
2002	10%	90%	0%
2003	10%	90%	0%
2004	10%	90%	0%
2005	10%	90%	0%
2006	10%	90%	0%

Based on [4]

Table B1.3: Leaching of arsenic, chromium and copper from wood with preservative CCA, CC and C, placed in year

years after new application	As		Cr				Cu				
	CCA		CCA		CC		CCA		CC		C
	without fixing	with fixing	without fixing	with fixing	without fixing	with fixing	without fixing	with fixing	without fixing	with fixing	with fixing
1	1.61%	1.61%	0.09%	0.07%	0.18%	0.14%	1.10%	0.22%	2.20%	0.44%	4.53%
2	1.45%	1.45%	0.02%	0.02%	0.04%	0.04%	0.17%	0.17%	0.34%	0.34%	1.01%
3	1.39%	1.39%	0.01%	0.01%	0.02%	0.02%	0.14%	0.14%	0.28%	0.28%	0.66%
4	1.35%	1.35%	0.01%	0.01%	0.02%	0.02%	0.13%	0.13%	0.26%	0.26%	0.49%
5	1.31%	1.31%	0.01%	0.01%	0.02%	0.02%	0.12%	0.12%	0.24%	0.24%	0.39%
6	1.29%	1.29%	0.01%	0.01%	0.02%	0.02%	0.11%	0.11%	0.22%	0.22%	0.32%
7	1.26%	1.26%	0.01%	0.01%	0.02%	0.02%	0.10%	0.10%	0.20%	0.20%	0.27%
8	1.24%	1.24%	0.01%	0.01%	0.02%	0.02%	0.09%	0.09%	0.18%	0.18%	0.23%
9	1.22%	1.22%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%	0.16%	0.16%	0.20%
10	1.20%	1.20%	0.00%	0.00%	0.00%	0.00%	0.07%	0.07%	0.14%	0.14%	0.17%
11	1.19%	1.19%	0.00%	0.00%	0.00%	0.00%	0.07%	0.07%	0.14%	0.14%	0.15%
12	1.17%	1.17%	0.00%	0.00%	0.00%	0.00%	0.06%	0.06%	0.12%	0.12%	0.14%
13	1.16%	1.16%	0.00%	0.00%	0.00%	0.00%	0.06%	0.06%	0.12%	0.12%	0.12%
14	1.14%	1.14%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.10%	0.10%	0.11%
15	1.13%	1.13%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.10%	0.10%	0.10%
16	1.12%	1.12%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.08%	0.08%	0.09%
17	1.10%	1.10%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.08%	0.08%	0.08%
18	1.09%	1.09%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.08%	0.08%	0.07%
19	1.08%	1.08%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.06%	0.06%	0.06%
20	1.07%	1.07%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.06%	0.06%	0.06%
21	1.06%	1.06%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.06%	0.06%	0.05%
22	1.05%	1.05%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.06%	0.06%	0.05%
23	1.03%	1.03%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.06%	0.06%	0.04%
24	1.02%	1.02%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.04%	0.04%	0.04%
25	1.01%	1.01%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.04%	0.04%	0.04%
26	1.00%	1.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.04%	0.04%	0.03%
27	0.99%	0.99%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.04%	0.04%	0.03%
28	0.99%	0.99%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.04%	0.04%	0.03%
29	0.98%	0.98%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.04%	0.04%	0.03%
30	0.97%	0.97%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.02%
31	0.96%	0.96%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.02%
32	0.95%	0.95%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.02%
33	0.94%	0.94%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.02%
34	0.93%	0.93%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.02%
35	0.92%	0.92%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.01%
36	0.91%	0.91%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.01%
37	0.91%	0.91%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.01%
38	0.90%	0.90%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.01%
39	0.89%	0.89%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.01%
40	0.88%	0.88%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.01%

Based on [4]

The assumption is that all wood was fixed from 1995 on. The leaching of CCA indicated here applies for type B and C. For copper only, the assumption is that leaching of type B is twice as high as that of type C.