



OSPACOMMISSION

*Protecting and conserving the
North-East Atlantic and its resources*

Mercury losses from the chlor-alkali industry in 2017

OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. The Contracting Parties are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. Les Parties contractantes sont l'Allemagne, la Belgique, le Danemark, l'Espagne, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède, la Suisse et l'Union européenne.

Acknowledgement

This report was compiled on the basis of data kindly provided by Euro-Chlor. It was prepared by Miss Eleanor Denning of the OSPAR Secretariat and assessed by the Expert Assessment Panel comprising Richard Moxon (UK).

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Executive summary

This report presents the 2017 data on production capacities, atmospheric emissions of mercury, and the amount of mercury in safely deposited wastes.

The mercury-cell-based chlorine production capacities have further decreased from 2014-2017, equating to a 40,80% reduction. This is primarily due to the shutting down of three mercury cell plants.

Mercury losses through product, waste water and air discharging into the OSPAR convention area have fallen by 50,01% since the last report published in 2016, continuing the decreasing trend since the mid-1990s.

Over the years, atmospheric emissions of mercury have been significantly reduced. Significant reductions are reported from all the relevant countries leading to a total of a 58.67% reduction from 2014 to 2017. All plants now comply with the limit value of 2 g Hg/t Cl₂ for air emissions in PARCOM Decision 90/3.

Altogether the reported figures show clearly the results of the efforts, which have been achieved since 1998.

Récapitulatif

Ce rapport présente les données de 2017 sur les capacités de production, les émissions atmosphériques du mercure et la quantité de mercure dans les déchets mis en décharges sécurisées.

Les capacités de production de chlore à base de cellules de mercure ont encore diminué entre 2014 et 2017 ; il s'agit d'une réduction de 40,80%. Ceci est dû en grande partie à la fermeture de trois installations à base de cellules de mercure.

Les pertes de mercure dans les produits, les eaux usées et l'air ont diminué de 50,01% depuis la publication du dernier rapport en 2016. La tendance à la baisse constatée depuis le milieu des années 1990 se poursuit.

Au cours des années, les émissions atmosphériques de mercure ont diminué de manière significative. Tous les pays pertinents notifient des réductions significatives dont le cumul représente une réduction de 58.67% entre 2014 et 2017. Toutes les usines se conforment à la valeur limite de 2 g Hg/t Cl₂ pour les émissions atmosphériques de la Décision PARCOM 90/3.

Dans l'ensemble les chiffres notifiés montrent clairement les résultats des efforts qui ont été réalisés depuis 1998.

1. Introduction

Under the former 1974 Convention for the prevention of marine pollution from land-based sources (the “Paris Convention”) the following Decisions and Recommendations were adopted to address mercury discharges, emissions and losses from the chlor-alkali industry:

- PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chlor-alkali Plants (exit of the purification plant);
- PARCOM Decision 81/1 on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site);
- PARCOM Decision 81/2 on Limit Values for Existing Waste Brine Chlor-Alkali Plants;
- PARCOM Decision 82/1 on New Chlor-Alkali Plants Using Mercury Cells;
- PARCOM Recommendation 85/1 on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site);
- PARCOM Decision 90/3 on Reducing Atmospheric Emissions from Existing Chlor-Alkali Plants.

The Decisions and Recommendations listed above continue to be applicable under the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”), which replaces the Paris Convention and establishes the OSPAR Commission.

In 1983, Contracting Parties to the former Paris Convention initiated annual reporting of mercury discharges, emissions and losses from their national chlor-alkali industry. Over time, reporting requirements and formats have been regularly reviewed and up-dated in light of the ongoing work under the Commission with regards to the chlor-alkali industry. With a view to harmonising the way in which data and information are being established and reported, the OSPAR Commission adopted in 2003 the current reporting formats and procedures (OSPAR Agreement number 2003-5) which set out the requirements for data and information to be provided via Euro Chlor. Annual data on discharges, emissions and losses of mercury from each plant operating within OSPAR Contracting Parties are reported to the OSPAR Secretariat, which, following a check and validation by Contracting Parties, compiles these technical data to form this report.

Following examination by the OSPAR Committee with responsibility for hazardous substances, the data are published by the OSPAR Commission in form of Annual Reports on Mercury Losses from the chlor-alkali Industry. This report series comprises yearly data series from 1982. The data are assessed by an Expert Assessment Panel every three years.

OSPAR acknowledges the assistance of Euro Chlor in assembling the information and appreciates the efforts made by Euro Chlor to provide all requested information on a plant-by-plant basis and recommends continuing this procedure in future.

This report continues the series of annual reports on discharges, emissions and losses of mercury by all routes from mercury-cell chlor-alkali plants. The report presents the 2017 data on production capacities, atmospheric emissions of mercury, and the amount of mercury in safely deposited wastes. The presentation of those figures since 1998 will also assist in the assessment of the effectiveness of the implementation of PARCOM Decision 90/3.

2. Assessment of the 2017 report on mercury losses from the chlor-alkali industry

The expert assessment panel noted that since Decision 90/3 was adopted in 1990, the number of mercury cell plants has reduced from 48 to 13, and that since 2014, three plants have been shut down.

Country	Active mercury cell plants
Belgium	1
France	2
Germany	3
Spain	6
Sweden	1

Since the last report published in 2016, (using data from 2014) mercury losses through product, wastewater and air discharging into the OSPAR convention area have fallen by 50,01%.

Atmospheric emissions have also continued to fall since 2014, by 58,67%.

The mercury-cell based Chlorine production capacities have further decreased from 2014-2017, equating to a 40,80% reduction.

With respect to PARCOM Decision 90/3 the panel notes that the requirement to meet a standard of 2g Hg/t Cl₂ capacity for emissions to the atmosphere has been easily met by all mercury cell plants, but that the objective that mercury cell plants should be phased out completely by 2010 has not yet been achieved.

The panel thanks Euro Chlor for providing the data and tables which made this evaluation simple and straightforward.

3. Evolution of mercury losses from the chlor-alkali industry (1982 - 2017)

The following figures give a rough indication of the evolution of mercury losses from the chlor-alkali industry in the period 1982-2017 as follows:

- Figure 1a: Chlorine Production Capacity with Mercury Cells by Contracting Party;
- Figure 1b: Total Chlorine Production Capacity with Mercury Cells;
- Figure 2a: Mercury Losses through Product, Waste Water and Air by Contracting Party;
- Figure 2b: Total Mercury Losses through Product, Waste Water and Air;
- Figure 3a: Atmospheric Emissions of Mercury by Contracting Party;

Mercury losses from the chlor-alkali industry in 2017

Figure 3b: Total Atmospheric Emissions of Mercury.

It should be noted that these figures use data from previously published OSPAR Reports and that the way in which these data, in particular the data preceding 1999, were calculated and reported might differ:

- from Contracting Party to Contracting Party;
- within a time series of one Contracting Party.

Therefore, the interpretation of the figures is limited and any comparisons have to be carried out with extreme caution.

It should also be noted that Finland and Switzerland were not Contracting Parties to the former Paris Convention. Prior to the entry into force of the OSPAR Convention, those Contracting Parties supplied data on a voluntary basis as follows:

- | | |
|-------------|---|
| Finland | from 1996 onwards, atmospheric emissions from the only mercury-based chlor-alkali plant, which discharges into the Baltic Sea (i.e. outside the OSPAR maritime area); |
| Switzerland | from 1993 onwards, full data sets for the national mercury-based and mercury-free chlor-alkali industry. |

For data reported prior to 1999, some information about changes in the reporting over time, as well as explanations of considerable increases or decreases in values, are given in footnotes to the OSPAR Report on Mercury Losses from the Chlor-alkali Industry (1982-1998), which was published in 2000 (available in hard copy only).

Further sources of information to be taken into account are the expert assessments, which were included in the publication of the Annual OSPAR Reports on Mercury Losses from the Chlor-alkali Industry from 1996 onwards.

Until 2003, data have been published in Figures 1 to 3 as total figures for each Contracting Party. Since 1998, data have been made available on a plant-by-plant basis¹. In order to improve comparability of performance, plant-by-plant data are now published in:

- | | |
|----------|---|
| Table 1: | Chlorine Production Capacity with Hg-cells (tonnes) |
| Table 2: | Mercury Losses through Product, Waste Water and Air (kg per year) |
| Table 3: | Mercury Losses through Product, Waste Water and Air (g per tonne production capacity) |
| Table 4: | Atmospheric Emissions of Mercury (kg per year) |
| Table 5: | Atmospheric Emissions of Mercury (g per tonne production capacity) |
| Table 6: | Mercury in Safely Deposited Wastes (kg per year) |
| Table 7: | Mercury in Safely Deposited Wastes (g per tonne production capacity) |

The presentation of these figures since 1998 also assists in:

- a. the review of progress to moving towards the OSPAR 2020 target of the cessation of discharges, emissions and losses of mercury;
- b. the assessment of the effectiveness of the implementation of PARCOM Decision 90/3.

¹ For plant codes in the tables see section 4.2.

To this end, all locations of mercury-based chlor-alkali plants in operation in 1998 are described in Section 4.2 including when they have been decommissioned or converted.

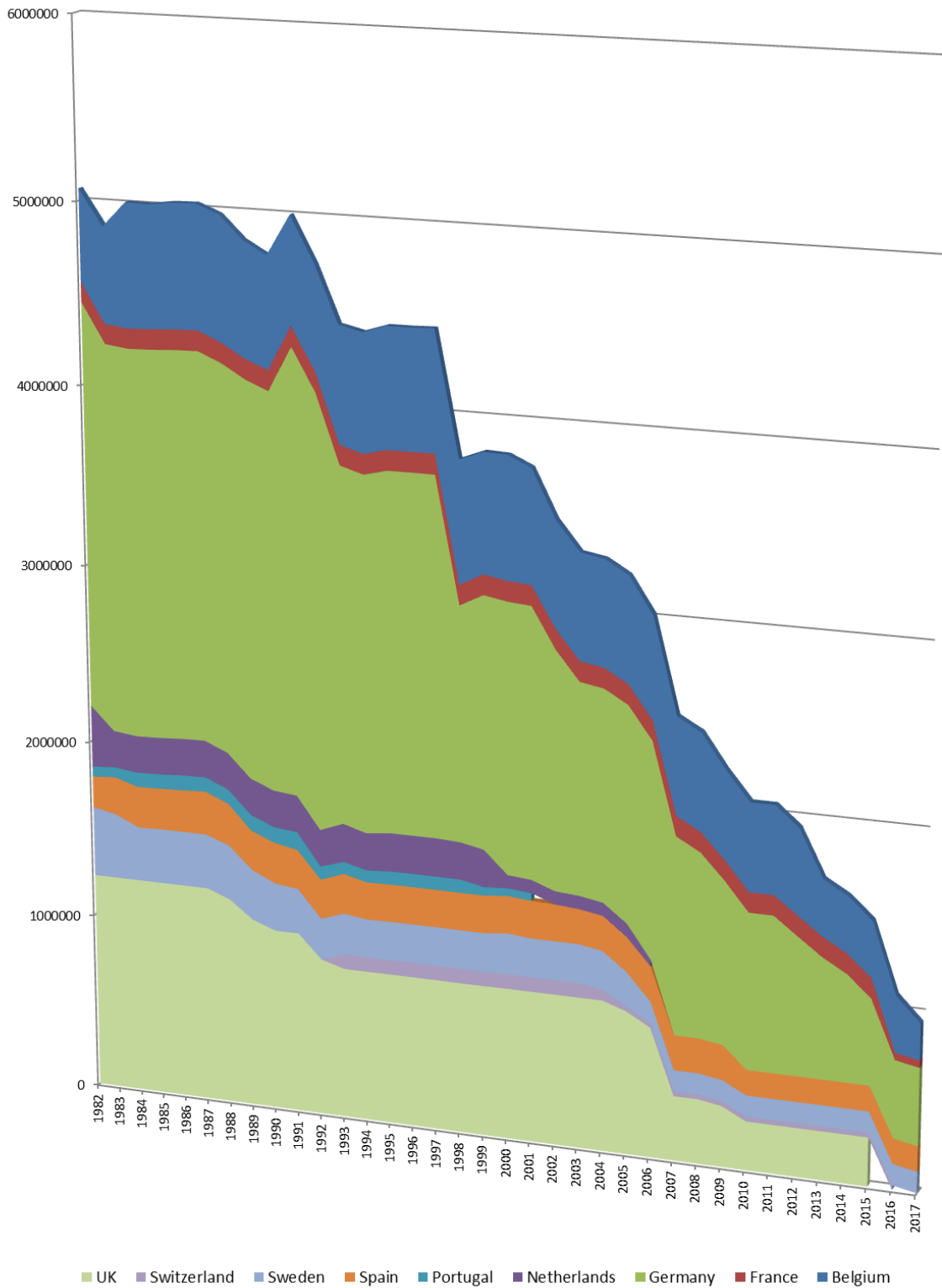


Figure 1a: Cumulative area chart showing chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area by Contracting Party (in kilotonnes per year)

Mercury losses from the chlor-alkali industry in 2017

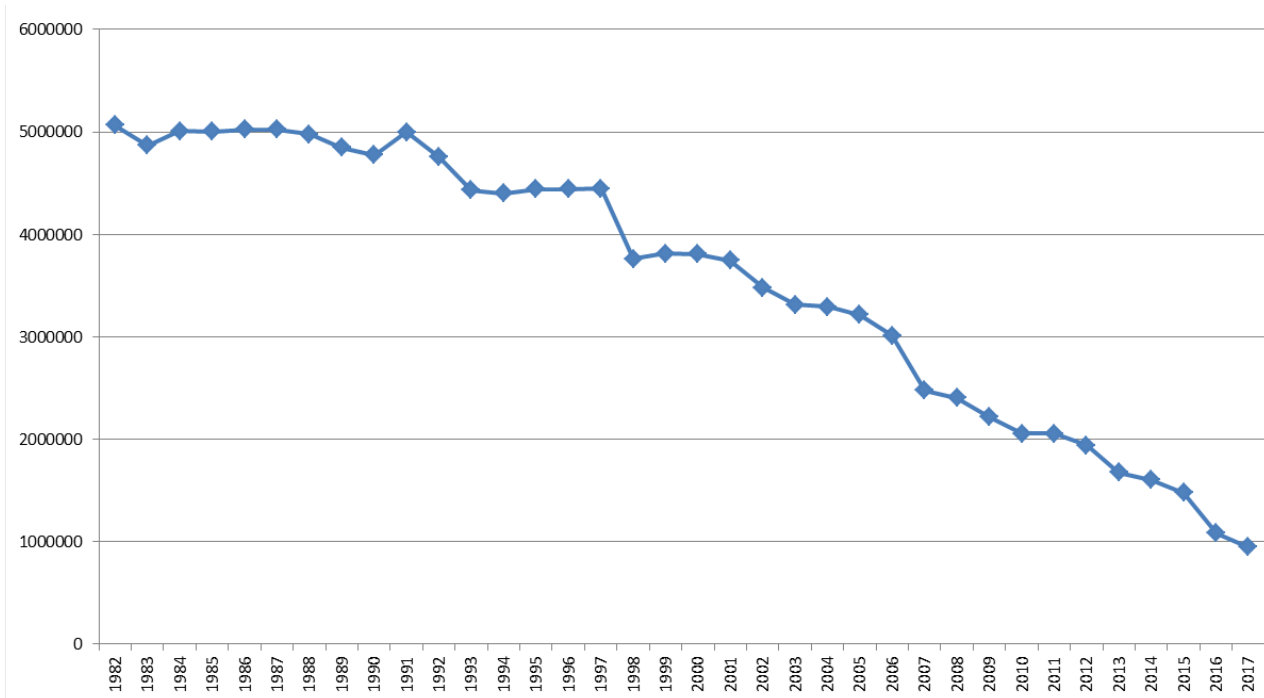


Figure 1b: Total chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area for all Contracting Parties (in kilotonnes per year)

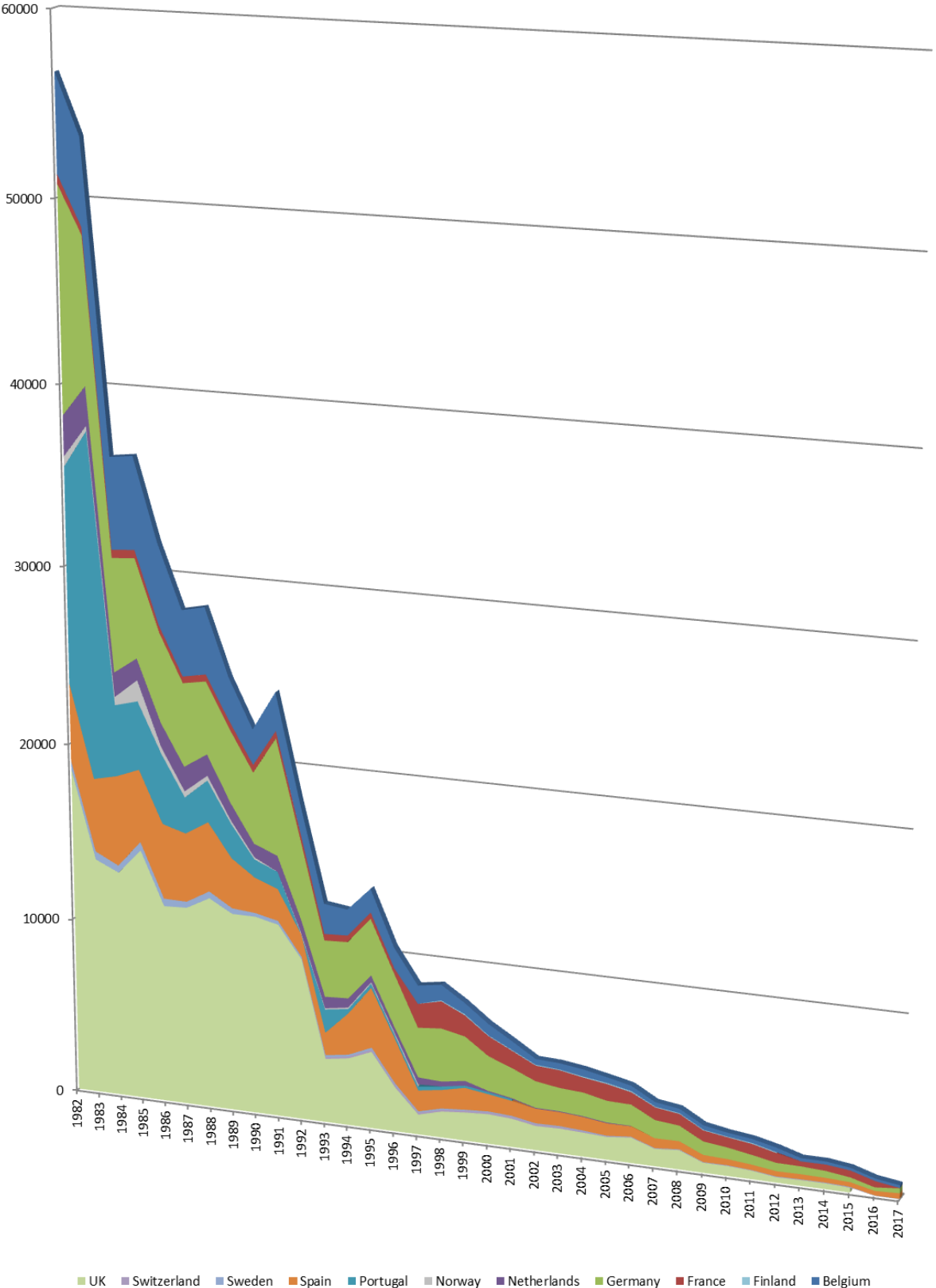


Figure 2a: Cumulative area chart showing mercury losses through product, wastewater and air (in kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants)

Mercury losses from the chlor-alkali industry in 2017

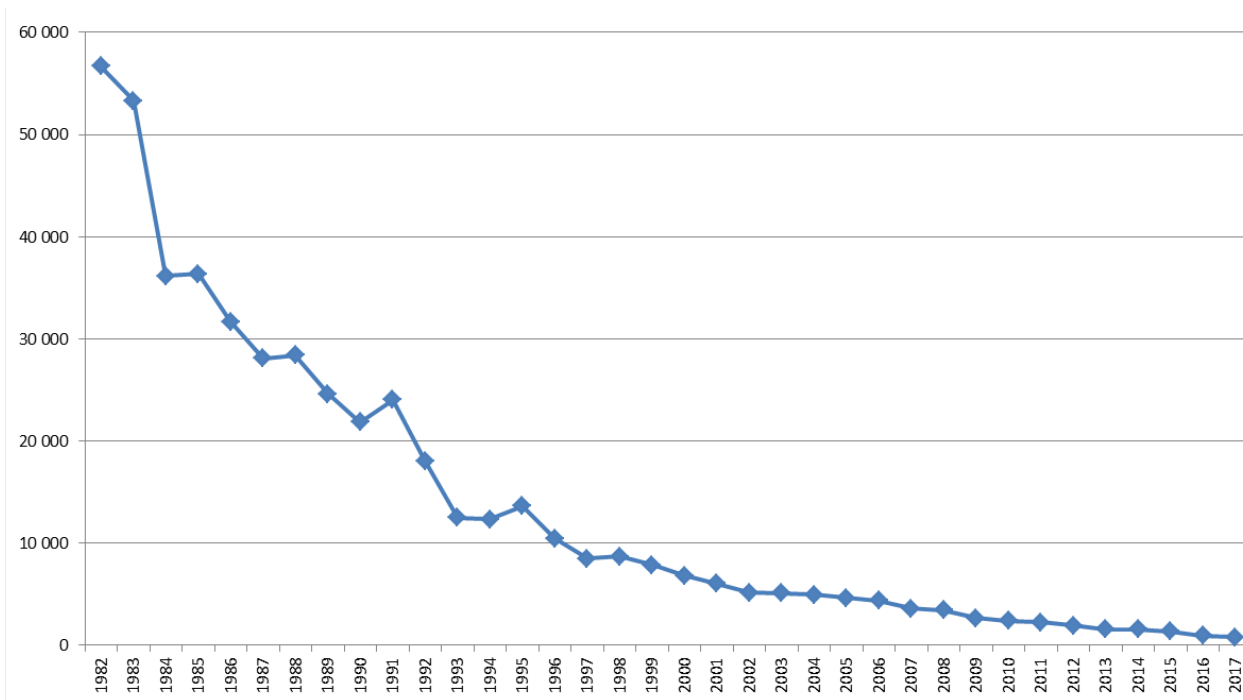


Figure 2b: Total mercury losses through product, wastewater and air for all Contracting Parties

(in kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants)

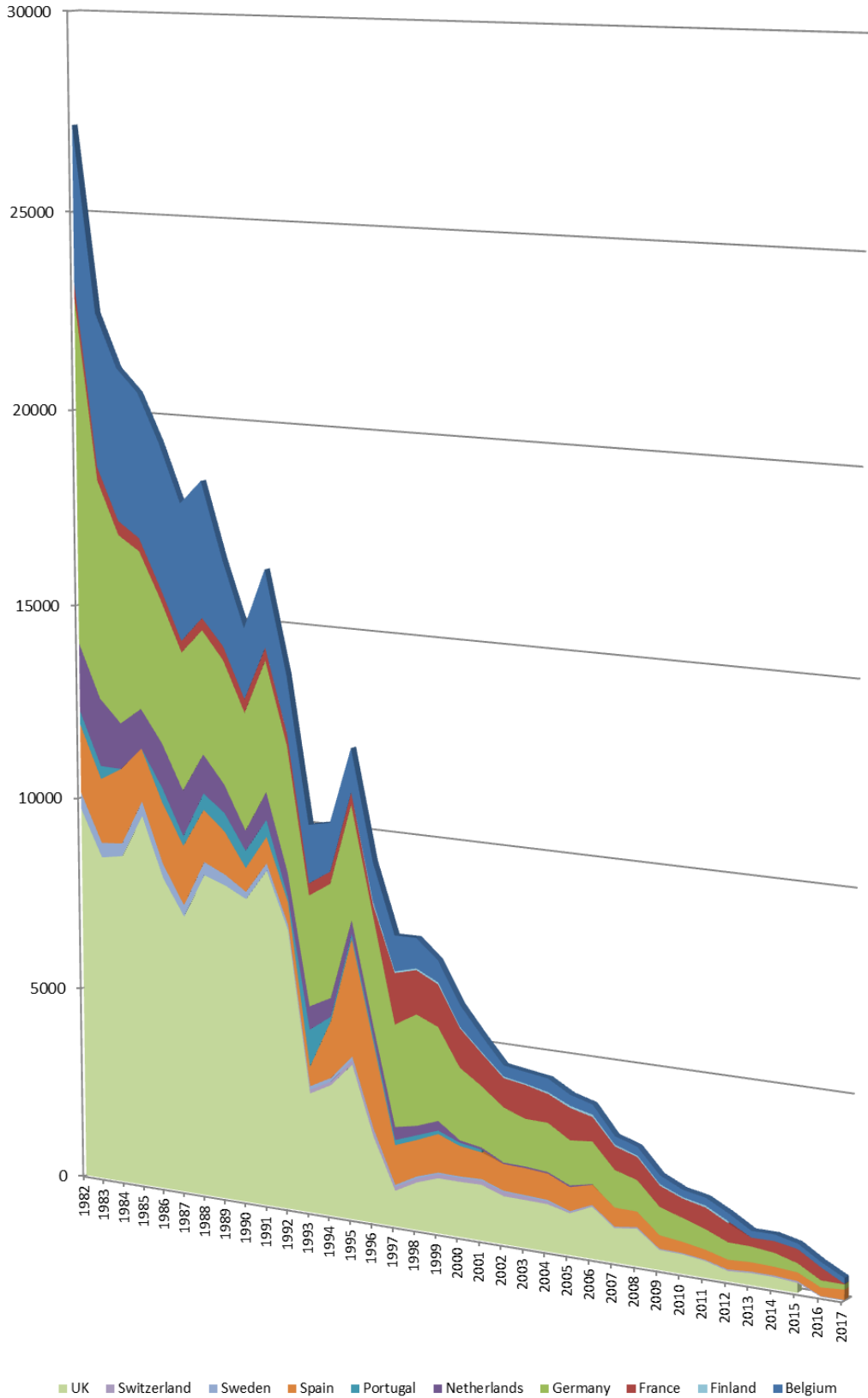


Figure 3a: Cumulative area chart showing atmospheric emissions of mercury from all plants from Contracting Parties (in kilograms per year, all plants)

Mercury losses from the chlor-alkali industry in 2017

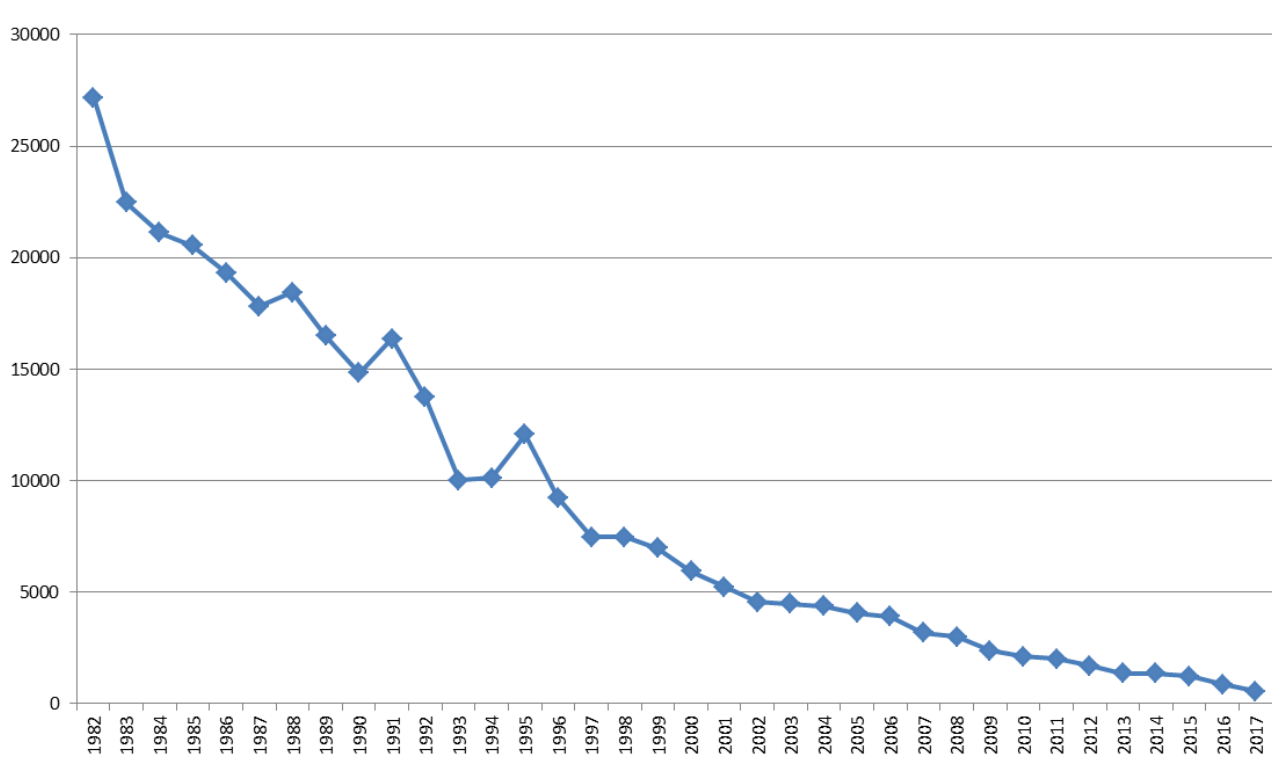


Figure 3b: Total atmospheric emissions of mercury from all plants for all Contracting Parties (in kilograms per year, all plants)

Table 1: Chlorine Production Capacity with Hg-cells (tonnes) from all plants

(* indicates plants discharging into OSPAR maritime area only)

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium																				
*BE/01	219000	230000	219000	219000	219000	219000	219000	219000	219000	219000	219000	180000	180000	180000	167006	SD	SD	SD	SD	SD
*BE/02	250000	250000	250000	250000	250000	250000	250000	250000	227500	205000	205000	205000	205000	205000	205000	205000	205000	205000	205000	205000
*BE/03	120000	100000	120000	120000	120000	120000	120000	120000	120000	120000	120000	110000	110000	110000	110000	110000	110000	110000	110000	SD
*BE/04	90900	82000	90900	41663	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	679900	662000	679900	630663	589000	589000	589000	589000	566500	544000	544000	495000	495000	495000	482006	315000	315000	315000	315000	205000
Finland																				
SFR/01	40000	40000	40000	40000	42485	42485	42485	42485	42485	42485	42485	42485	40000	40000	40000	40000	N/A	N/A	N/A	N/A
Total	40000	40000	40000	40000	42485	42485	42485	42485	42485	42485	42485	42485	40000	40000	40000	40000	0	0	0	0
France																				
*FR/01	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040	18040
*FR/02	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	72000	MT
FR/03	240900	240900	240900	240900	240900	240900	240900	240900	240900	240900	240900	240900	240000	240000	222128	SD	SD	SD	SD	SD
FR/04	170070	170070	170070	170070	170070	170070	170070	170070	170070	170070	170070	170070	170070	170070	127550	100642	MT	MT	MT	MT
*FR/05	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500
FR/06	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	166000	SD
FR/07	184300	184300	184300	184300	184300	184300	184300	184300	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	873810	873810	873810	873810	873810	873810	873810	873810	689510	689510	689510	689510	688610	688610	628218	379182	278540	278540	206540	40540
Germany																				
DE/01	130000	65000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*DE/02	130000	130000	140000	140000	110000	110000	110000	130000	130000	130000	130000	130000	130000	130000	29957	SD	SD	SD	SD	SD
*DE/03	120000	120000	125000	125000	125000	125000	125000	125000	125276	125276	125276	125276	125276	125276	125276	125276	125276	125276	125276	125276
*DE/04	150000	300000	300000	300000	153000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/05	180000	150000	160000	160000	160000	160000	160000	165500	170000	170000	170000	170000	170000	170000	170000	170000	174711	174711	174711	174711
*DE/06	65000	130000	148828	148828	148828	148828	148828	148828	148828	148828	148828	148828	148828	148828	148828	80808	SD	SD	SD	SD
*DE/07	160000	180000	182000	176000	176000	176000	176000	176000	176000	72811	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
*DE/08	200000	98000	135951	135951	135951	135951	135951	135951	135951	135951	135951	137400	137400	137400	137400	137400	137400	137400	137400	137400
*DE/09	150000	150000	160000	167000	167000	167000	167000	167000	167000	167376	167000	167000	167000	167000	167000	167000	167000	167000	47156	MT
DE/10	300000	248000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	50000	60000	9804	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	72000	157000	157000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/13	157000	150000	160000	160000	160000	160000	160000	160000	160000	160000	160000	39216	MT	MT	MT	MT	MT	MT	MT	MT
DE/14	300000	72000	82355	82355	82355	82355	82355	82355	82355	82355	82355	41178	MT	MT	MT	MT	MT	MT	MT	MT
DE/15	120000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	2284000	2010000	1760938	1595134	1418134	1265134	1265134	1290634	1295410	1192597	1119410	958898	878504	878504	778461	680484	604387	437387	437387	437387
Netherlands																				
*NL/01	70000	70000	74294	74294	74294	74294	74294	74294	37452	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*NL/02	140000	140000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	210000	210000	74294	74294	74294	74294	74294	74294	37452	0	0	0	0	0	0	0	0	0	0	0
Portugal																				
*P/01	48600	48000	43302	43302	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*P/02	26400	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	75000	48000	43302	43302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain																				

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
ES/01	31920	30000	31373	31373	31373	31373	31373	31373	31373	31373	31373	31373	31373	31373	31373	31373	31373	31373	MT	MT	MT
*ES/02	14815	15000	14815	14815	9877	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
*ES/03	33552	33500	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552	33552
ES/04	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	115200	115200	115200	87626	78434	78434	78434	78434	78434
*ES/05	62745	63000	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747	62747
ES/06	209200	209000	217871	217871	217871	217871	217871	217871	217871	217871	217871	217871	217871	217871	217871	217871	217653	217653	217653	217653	217653
ES/07	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	10417	MT	MT	MT	MT	MT	MT	MT	MT	MT
ES/08	135000	135000	135004	135004	135004	135004	135004	135004	135004	135004	135004	135004	135000	135000	135000	135000	135000	135000	135000	135000	135000
*ES/09	101000	101000	100929	100929	100929	100929	100929	100929	100929	100929	100929	100929	47496	47496	47496	47496	47496	47496	47496	47496	47496
Total	763232	761500	771291	771291	766353	756476	756476	756476	756476	756476	756476	741893	643239	643239	643239	615665	606255	574882	574882	574882	574882
Sweden																					
*SE/01	100000	100000	100000	100000	100000	100000	100000	74355	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	
*SE/02	120000	120000	132000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000
Total	220000	220000	232000	220000	220000	220000	220000	194355	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000	120000
Switzerland																					
*CH/01	55000	55000	55000	55000	55000	55000	32083	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	
CH/02	26500	22000	26500	26500	26500	26500	26500	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	
*CH/03	27000	26500	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	26500	26500	26500	26500	MT
Total	108500	103500	108500	108500	108500	108500	85583	27000	27000	27000	27000	27000	27000	27000	27000	27000	26500	26500	26500	26500	0
United Kingdom																					
*UK/01	29000	29000	29413	29413	29413	29413	29413	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	
*UK/02	89872	89000	89872	89872	89872	89872	89872	74855	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	
*UK/03	737000	738000	738000	738000	738000	738000	738000	738000	738000	367000	367000	346000	277000	277000	277000	277000	277000	277000	277000	SD	SD
Total	855872	856000	857285	857285	857285	857285	857285	812855	738000	367000	367000	346000	277000	277000	277000	277000	277000	277000	277000	0	0

Mercury losses from the chlor-alkali industry in 2017

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

Production capacity of all installations in the Convention area

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	6110314	5784810	5441320	5214279	4949861	4786984	4764067	4660909	4272833	3739068	3665881	3420786	3169353	3169353	2995924	2454331	2227682	2029309	1680309	1377809
%	100	95	89	85	81	78	78	76	70	61	60	56	52	52	49	40	36	33	27	23

Production capacity of installations in the OSPAR catchment area

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	3759424	3810540	3805143	3744906	3478003	3315126	3292209	3215551	3011775	2478010	2404823	2215488	2053839	2053839	1940802	1675819	1599222	1432222	1083222	946722
%	100	101	101	100	93	88	88	86	80	66	64	59	55	55	52	45	43	38	29	25

Table 2: Mercury Losses through Product, Waste Water and Air (kg per year)

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium																				
*BE/01	304	173	157	122	82	92	142	88	98	56	60	60	60	49	94	SD	SD	SD	SD	SD
*BE/02	200	178	180	175	169	186	178	179	142	131	128	129	108	127	109	131	130	107	104	155
*BE/03	168	113	111	88	78	85	82	60	64	67	64	59	52	53	50	50	48	46	40	SD
*BE/04	222	173	201	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	894	637	649	505	329	363	402	327	304	254	252	248	220	229	253	181	178	153	144	155
Finland																				
SFR/01	49	63	43	41	44	37	56	59	63	42	42	41	40	50	51	NI	N/A	N/A	N/A	N/A
Total	49	63	43	41	44	37	56	59	63	42	42	41	40	50	51	0	0	0	0	0
France																				
*FR/01	30	28	29	24	15	12	25	21	13	26	14	21	30	25	12	16	18	16	14	14
*FR/02	117	129	119	121	92	118	116	125	119	122	104	85	99	72	50	63	89	75	MT	MT
FR/03	569	345	338	226	216	245	189	202	224	244	271	226	202	242	238	SD	SD	SD	SD	SD
FR/04	221	192	220	203	152	127	96	106	119	111	100	105	123	109	99	75	MT	MT	MT	MT
*FR/05	30	32	32	33	34	33	32	29	29	24	24	23	22	22	20	20	24	23	24	N/D
FR/06	217	190	152	139	175	185	147	168	195	188	145	159	95	148	128	106	224	269	311	SD
FR/07	356	281	243	237	202	282	242	290	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	1540	1197	1133	983	886	1002	847	941	699	715	658	619	571	618	547	280	355	383	349	14
Germany																				
DE/01	118	111	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*DE/02	203	147	247	159	127	128	103	94	97	85	77	72	61	82	15	SD	SD	SD	SD	SD
*DE/03	277	49	73	75	78	80	92	86	91	104	120	53	49	51	51	58	76	78	59	172
*DE/04	369	367	367	358	285	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/05	278	261	166	162	157	169	173	169	160	151	153	153	153	146	122	109	101	86	86	46
*DE/06	98	70	62	52	49	77	116	64	97	74	95	111	104	67	77	33	SD	SD	SD	SD
*DE/07	273	313	257	199	218	289	260	194	179	84	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/08	74	193	209	228	174	159	151	170	162	150	126	124	126	77	78	94	65	62	57	62
*DE/09	184	161	165	197	199	213	244	243	207	170	146	192	162	124	125	149	148	41	MT	MT
DE/10	243	391	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	69	104	18	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	113	132	137	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/13	142	137	171	201	163	146	141	153	158	159	117	35	MT	MT	MT	MT	MT	MT	MT	MT
DE/14	285	100	112	80	67	64	62	56	55	52	45	20	MT	MT	MT	MT	MT	MT	MT	MT
DE/15	304	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	3030	2536	1984	1711	1517	1325	1342	1229	1206	1029	879	760	655	547	468	443	390	226	202	280
Netherlands																				
*NL/01	92	71	68	57	41	45	42	46	22	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*NL/02	190	196	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	282	267	68	57	41	45	42	46	22	0	0	0	0	0	0	0	0	0	0	0
Portugal																				
*P/01	142	130	121	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*P/02	60	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	202	130	121	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain																				
ES/01	122	61	63	58	48	45	46	38	35	30	24	24	22	21	24	22	0	MT	MT	MT
*ES/02	79	30	29	25	16	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
*ES/03	34	66	57	52	38	42	32	30	27	23	21	18	17	17	16	16	16	16	16	16
ES/04	140	287	164	114	123	137	121	121	110	102	103	78	53	48	44	29	31	31	24	25
*ES/05	216	142	102	101	86	74	92	47	29	34	40	42	31	36	41	36	38	39	39	65
ES/06	62	182	182	193	185	199	205	203	154	156	89	96	111	94	76	93	92	87	86	77
ES/07	223	53	49	32	36	30	26	25	25	24	20	8	MT	MT	MT	MT	MT	MT	MT	MT
ES/08	45	251	244	176	174	174	154	139	137	120	97	88	80	73	74	68	68	70	71	93
*ES/09	136	175	95	103	132	99	94	109	68	70	68	50	29	20	21	20	19	19	22	34
Total	1057	1247	985	854	838	800	770	712	585	559	462	404	343	309	296	284	264	262	258	310
Sweden																				
*SE/01	24	27	28	29	26	22	25	14	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*SE/02	41	18	19	18	17	19	22	20	20	20	22	17	17	16	18	18	18	17	18	20
Total	65	45	47	47	43	41	47	34	20	20	22	17	17	16	18	18	18	17	18	20
Switzerland																				
*CH/01	62	82	70	64	73	67	39	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/02	23	19	20	28	19	19	11	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*CH/03	26	15	19	25	17	12	22	30	32	20	21	18	26	16	26	21	26	33	0	MT
Total	111	116	109	117	109	98	72	30	32	20	21	18	26	16	26	21	26	33	0	0

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
United Kingdom																				
*UK/01	14	15	16	17	18	35	54	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*UK/02	106	125	144	157	175	144	154	112	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*UK/03	1373	1476	1535	1439	1188	1237	1155	1183	1444	983	1097	567	565	485	302	332	330	271	SD	SD
Total	1493	1616	1695	1613	1381	1416	1363	1295	1444	983	1097	567	565	485	302	332	330	271	0	0

Total mercury losses through product, waste water and air from all installations in the Convention area

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
kg/year	8723	7854	6834	6028	5188	5127	4941	4673	4375	3622	3433	2674	2437	2270	1961	1559	1561	1345	971	779
%	100	90	78	69	59	59	57	54	50	42	39	31	28	26	22	18	18	15	11	9

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

SD: Shutdown

Table 3: Mercury Losses through Product, Waste Water and Air (g per tonne production capacity)

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium																				
*BE/01	1,39	0,75	0,715	0,556	0,374	0,419	0,649	0,4	0,446	0,258	0,28	0,33	0,34	0,271	0,56	SD	SD	SD	SD	SD
*BE/02	0,8	0,71	0,72	0,699	0,676	0,744	0,712	0,718	0,624	0,639	0,62	0,63	0,53	0,62	0,53	0,64	0,635	0,52	0,508	0,75707
*BE/03	1,4	1,125	0,921	0,736	0,647	0,712	0,684	0,503	0,539	0,558	0,53	0,54	0,47	0,48	0,45	0,455	0,4357	0,42	0,36082	SD
*BE/04	2,44	2,11	2,212	2,89	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	6,03	4,695	4,568	4,881	1,697	1,875	2,045	1,621	1,609	1,455	1,43	1,5	1,34	1,371	1,54	1,095	1,0707	0,94	0,86882	0,75707
Finland																				
SFR/01	1,23	1,574	1,078	1,026	1,046	0,878	1,324	1,38	1,478	0,994	1	0,95	0,99	1,24	1,28	1,22	N/A	N/A	N/A	N/A
Total	1,23	1,574	1,078	1,026	1,046	0,878	1,324	1,38	1,478	0,994	1	0,95	0,99	1,24	1,28	1,22	N/A	N/A	N/A	N/A
France																				
*FR/01	1,66	1,58	1,631	1,317	0,819	0,646	1,4	1,149	0,72	1,416	0,79	1,14	1,69	1,39	0,66	0,878	1,02	0,9	0,777	0,796
*FR/02	1,63	1,792	1,646	1,68	1,277	1,644	1,615	1,732	1,658	1,689	1,44	1,19	1,37	1	0,7	0,881	1,24	1,04	MT	MT
FR/03	2,36	1,431	1,403	0,94	0,896	1,019	0,785	0,838	0,932	1,011	1,13	0,94	0,84	1,01	1,07	SD	SD	SD	SD	SD
FR/04	1,3	1,131	1,292	1,197	0,896	0,746	0,567	0,621	0,699	0,65	0,59	0,62	0,72	0,64	0,78	0,745	MT	MT	MT	MT
*FR/05	1,34	1,444	1,436	1,457	1,509	1,469	1,402	1,308	1,277	1,086	1,05	1,02	0,98	0,99	0,88	0,906	1,05	1,02	1,0739	N/D
FR/06	1,31	1,144	0,917	0,836	1,054	1,117	0,883	1,015	1,173	1,135	0,87	0,96	0,57	0,89	0,77	0,638	1,35	1,62	1,874	SD
FR/07	1,93	1,522	1,32	1,286	1,094	1,53	1,312	1,574	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	11,53	10,044	9,645	8,713	7,545	8,171	7,964	8,237	6,459	6,987	5,87	5,87	6,17	5,92	4,86	4,048	4,66	4,58	3,7249	0,796
Germany																				
DE/01	1,72	1,707	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/02	1,45	1,128	1,766	1,132	1,153	1,163	0,934	0,724	0,743	0,651	0,59	0,55	0,47	0,63	0,49	SD	SD	SD	SD	SD

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*DE/03	2,22	0,406	0,583	0,601	0,622	0,64	0,733	0,689	0,73	0,83	0,96	0,42	0,39	0,41	0,41	0,463	0,604	0,62	0,47	1,375
*DE/04	1,23	1,223	1,223	1,193	1,862	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/05	1,74	1,74	1,04	1,01	0,98	1,06	1,083	1,02	0,94	0,89	0,9	0,9	0,9	0,86	0,72	0,64	0,58	0,49	0,49	0,265
*DE/06	0,75	0,54	0,416	0,348	0,326	0,515	0,777	0,428	0,655	0,496	0,64	0,75	0,7	0,45	0,52	0,407	SD	SD	SD	SD
*DE/07	1,5	1,74	1,41	1,13	1,24	1,64	1,479	1,101	1,018	1,156	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/08	0,75	1,97	1,54	1,68	1,281	1,167	1,111	1,254	1,193	1,102	0,93			0,56	0,57	0,629	0,472	0,45	0,415	0,452
*DE/09	1,08	1,07	1,032	1,182	1,189	1,279	1,464	1,455	1,238	1,014	0,87	1,15	0,97	0,74	0,75	0,891	0,8837	0,863	MT	MT
DE/10	0,98	1,576	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/11	2,17	1,74	1,864	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	0,72	0,843	0,871	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/13	0,89	0,91	1,069	1,259	1,019	0,911	0,884	0,956	0,985	0,994	0,74	0,9	MT	MT	MT	MT	MT	MT	MT	MT
DE/14	1,48	1,39	1,364	0,966	0,815	0,776	0,757	0,68	0,669	0,63	0,55	0,49	MT	MT	MT	MT	MT	MT	MT	MT
DE/15	1,52	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	20,2	17,983	14,178	10,501	10,487	9,151	9,222	8,307	8,171	7,763	6,18	5,16	3,43	3,65	3,46	3,03	2,5397	2,423	1,375	2,092
The Netherlands																				
*NL/01	0,99	1,008	0,909	0,765	0,551	0,61	0,571	0,615	0,587	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*NL/02	1,5	1,4	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	2,49	2,408	0,909	0,765	0,551	0,61	0,571	0,615	0,587	0	0	0	0	0	0	0	0	0	0	0
Portugal																				
*P/01	2,64	2,7	2,8	2,3	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*P/02	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	2,64	2,7	2,8	2,3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Spain																				
ES/01	1,95	2,04	2,02	1,861	1,545	1,43	1,461	1,204	1,122	0,971	0,78	0,77	0,71	0,66	0,76	0,716	NI	MT	MT	MT
*ES/02	2,25	2,02	1,948	1,667	1,626	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
*ES/03	2,96	1,97	1,699	1,563	1,123	1,264	0,945	0,884	0,81	0,682	0,62	0,53	0,51	0,51	0,49	0,468	0,464	0,47	0,4743	0,48076
ES/04	1,81	1,91	1,094	0,762	0,821	0,911	0,811	0,806	0,73	0,683	0,69	0,52	0,46	0,42	0,38	0,333	0,389	0,39	0,309	0,3247
*ES/05	2,61	2,259	1,632	1,608	1,368	1,172	1,461	0,756	0,458	0,548	0,63	0,68	0,5	0,58	0,65	0,577	0,605	0,62	0,614	1,032
ES/06	0,73	0,87	0,834	0,885	0,848	0,914	0,944	0,933	0,708	0,715	0,41	0,44	0,51	0,43	0,35	0,426	0,422	0,4	0,394	0,352
ES/07	2,6	2,1	1,94	1,265	1,428	1,22	1,03	1,017	1,02	0,969	0,8	0,78	MT	MT	MT	MT	MT	MT	MT	MT
ES/08	1,73	1,86	1,81	1,3	1,29	1,29	1,14	1,03	1,014	0,89	0,72	0,65	0,59	0,54	0,55	0,5	0,503	0,52	0,524	0,69
*ES/09	1,42	1,73	0,938	1,021	1,309	0,976	0,933	1,081	0,676	0,693	0,68	0,49	0,61	0,42	0,44	0,422	0,391051	0,41	0,469	0,722
Total	18,06	16,759	13,915	11,932	11,358	9,177	8,725	7,711	6,538	6,151	5,33	4,86	3,89	3,56	3,62	3,442	2,774051	2,81	2,7843	3,60146
Sweden																				
*SE/01	0,44	0,268	0,278	0,288	0,258	0,221	0,248	0,186	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*SE/02	0,19	0,154	0,144	0,154	0,143	0,161	0,188	0,167	0,165	0,166	0,18	0,14	0,14	0,13	0,15	0,152	0,1478	0,14	0,153	0,1648
Total	0,63	0,422	0,422	0,442	0,401	0,382	0,436	0,353	0,165	0,166	0,18	0,14	0,14	0,13	0,15	0,152	0,1478	0,14	0,153	0,1648
Switzerland																				
*CH/01	1,12	1,49	1,271	1,162	1,336	1,227	1,227	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/02	NI	0,877	0,743	1,054	0,699	0,712	0,429	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*CH/03	0,98	0,56	0,692	0,917	0,638	0,434	0,802	1,11	1,17	0,727	0,76	0,67	0,98	0,6	0,97	0,79	0,9831	1,26	NI	MT
Total	2,1	2,927	2,706	3,133	2,673	2,373	2,458	1,11	1,17	0,727	0,76	0,67	0,98	0,6	0,97	0,79	0,9831	1,26	0	0
United Kingdom																				
*UK/01	0,64	0,525	0,538	0,574	0,606	1,18	1,852	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*UK/02	1,29	1,41	1,6	1,744	1,95	1,6	1,71	1,494	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*UK/03	1,84	2	2,08	1,95	1,61	1,677	1,565	1,603	1,957	2,679	2,99	1,64	2,04	1,75	1,09	1,2	1,19	0,98	SD	SD
Total	3,77	3,935	4,218	4,268	4,166	4,457	5,127	3,097	1,957	2,679	2,99	1,64	2,04	1,75	1,09	1,2	1,19	0,98	0	0

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

SD: Shutdown

Table 4: Atmospheric Emissions of Mercury (kg per year)

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium																				
*BE/01	289	156	137	106	68	74	120	67	79	43	50	54	42	37	55	SD	SD	SD	SD	SD
*BE/02	176	154	157	153	153	164	160	164	129	122	121	121	102	119	102	126	123	96	98	144
*BE/03	146	101	98	74	63	62	64	49	49	52	50	47	42	44	45	47	45	42	36	SD
*BE/04	161	146	172	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	772	557	564	413	284	300	344	280	257	217	221	222	186	200	203	173	168	138	134	144
Finland																				
SFR/01	40	53	35	34	39	31	46	54	57	37	39	38	37	46	50	NI	N/A	N/A	N/A	N/A
Total	40	53	35	34	39	31	46	54	57	37	39	38	37	46	50	NI	N/A	N/A	N/A	N/A
Germany																				
DE/01	105	105	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/02	173	135	235	146	114	113	98	88	88	78	73	68	56	78	14	SD	SD	SD	SD	SD
*DE/03	238	39	63	68	71	74	86	80	84	82	88	46	43	46	48	52	66	61	49	44
*DE/04	354	353	353	345	274	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/05	255	255	160	155	150	163	167	162	153	144	146	146	146	139	116	102	94	79	79	39
*DE/06	92	66	58	48	45	72	111	59	48	70	90	106	100	63	73	31	SD	SD	SD	SD
*DE/07	256	301	244	187	206	276	247	181	166	80	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/08	84	175	171	179	141	113	114	142	141	139	111	111	110	68	69	75	49	47	47	47
*DE/09	150	149	151	185	188	203	233	232	195	158	136	182	145	117	115	133	137	39	MT	MT
DE/10	285	382		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	105	100	18	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	97	119	128	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*DE/13	280	124	158	177	144	135	131	142	148	148	104	34	MT	MT	MT	MT	MT	MT	MT	MT
DE/14	128	96	110	74	65	62	60	54	53	51	42	20	MT	MT	MT	MT	MT	MT	MT	MT
DE/15	103	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	2705	2399	1849	1564	1398	1211	1247	1140	1076	950	790	713	600	511	434	392	346	225	175	130
France																				
*FR/01	26	25	26	21	12	7	14	11	11	12	12	19	24	21	9	12	16	14	12	13
*FR/02	111	115	103	108	80	103	106	113	109	96	96	76	94	66	45	57	68	68	MT	MT
FR/03	301	320	313	210	202	235	181	191	212	226	259	219	192	238	233	SD	SD	SD	SD	SD
FR/04	179	182	188	171	109	88	67	64	89	84	74	72	87	78	64	49	MT	MT	MT	MT
*FR/05	24	25	25	26	27	27	26	24	24	19	19	18	18	18	17	17	17	16	17	N/D
FR/06	160	161	129	109	147	142	118	139	172	159	117	129	68	120	108	84	190	252	292	SD
FR/07	330	255	223	186	170	255	217	275	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	1131	1083	1007	831	747	857	729	817	617	596	577	533	483	540	475	219	292	351	321	13
The Netherlands																				
*NL/01	65	65	65	53	37	42	40	42	20	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*NL/02	180	178	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	245	243	65	53	37	42	40	42	20	0	0	0	0	0	0	0	0	0	0	0
Portugal																				
*P/01	92	91	82	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*P/02	28	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	120	91	82	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Spain																				
ES/01	31	38	45	36	33	38	40	32	30	26	19	21	20	19	20	19	0	MT	MT	MT
*ES/02	21	20	19	17	12	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
*ES/03	66	51	43	32	23	31	23	21	21	17	16	15	14	14	13	13	13	13	14	13
ES/04	210	218	118	69	80	114	105	101	92	92	89	66	42	40	37	26	27	27	21	22
*ES/05	109	91	85	91	77	63	74	38	20	20	26	27	18	22	30	26	25	23	23	53
ES/06	126	157	165	178	171	182	193	188	146	144	83	90	99	85	65	78	80	78	79	68
ES/07	48	35	27	22	28	26	22	22	22	21	18	7	MT	MT	MT	MT	MT	MT	MT	MT
ES/08	203	227	204	155	148	151	128	117	117	101	82	69	63	57	59	55	57	58	58	69
*ES/09	123	152	74	84	112	81	85	93	59	62	61	46	27	19	19	19	17	17	20	31
Total	937	989	780	684	684	686	670	612	507	483	394	341	283	255	245	236	219	216	216	256
Sweden																				
*SE/01	37	25	25	27	23	20	23	13	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*SE/02	21	17	17	17	15	16	20	18	19	18	20	16	16	14	17	17	15	16	17	19
Total	58	42	42	44	38	36	43	31	19	18	20	16	16	14	17	17	15	16	17	19
Switzerland																				
*CH/01	57	75	63	58	69	65	38	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/02	21	19	19	27	18	18	11	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*CH/03	18	10	14	17	14	8	17	22	27	15	17	11	14	13	21	17	22	30	0	MT
Total	96	104	96	102	101	91	66	22	27	15	17	11	14	13	21	17	22	30	0	0
United Kingdom																				
*UK/01	14	14	14	13	13	29	49	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*UK/02	106	117	137	149	169	137	147	108	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*UK/03	1107	1292	1269	1270	1048	1053	1010	958	1322	876	951	509	493	421	260	305	299	249	SD	SD
Total	1227	1423	1420	1432	1230	1219	1206	1066	1322	876	951	509	493	421	260	305	299	249	0	0

Total atmospheric emissions of mercury from all installations in the OSPAR Convention area

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Kg/year	7331	6984	5940	5226	4558	4473	4391	4064	3902	3192	3009	2383	2112	2001	1705	1359	1360	1226	863	562
%	100	95,3	81,0	71,3	62,2	61,0	59,9	55,4	53,2	43,5	41,0	32,5	28,8	27,3	23,3	18,5	18,6	16,7	11,8	7,7

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

SD: Shutdown

Table 5: Atmospheric Emissions of Mercury (g per tonne production capacity)

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium																				
*BE/01	1,32	0,68	0,63	0,48	0,31	0,34	0,55	0,31	0,36	0,20	0,23	0,30	0,23	0,21	0,33	SD	SD	SD	SD	SD
*BE/02	0,71	0,62	0,63	0,62	0,61	0,66	0,64	0,65	0,57	0,60	0,59	0,59	0,50	0,58	0,50	0,61	0,60	0,47	0,48	0,70
*BE/03	1,22	1,01	0,81	0,62	0,52	0,52	0,53	0,41	0,41	0,43	0,42	0,43	0,39	0,40	0,41	0,43	0,41	0,38	0,33	SD
*BE/04	1,77	1,78	1,89	1,93	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	5,02	4,09	3,96	3,64	1,45	1,51	1,72	1,37	1,34	1,23	1,24	1,32	1,12	1,19	1,24	1,04	1,01	0,85	0,81	0,70
Finland																				
SFR/01	1,00	1,32	0,89	0,86	0,92	0,74	1,08	1,27	1,34	0,87	0,92	0,90	0,93	1,16	1,24	NI	N/A	N/A	N/A	N/A
Total	1,00	1,32	0,89	0,86	0,92	0,74	1,08	1,27	1,34	0,87	0,92	0,90	0,93	1,16	1,24	NI	N/A	N/A	N/A	N/A
France																				
*FR/01	1,39	1,38	1,44	1,15	0,65	0,42	0,76	0,62	0,60	0,65	0,66	1,03	1,32	1,11	0,48	0,68	0,90	0,79	0,67	0,73
*FR/02	1,54	1,60	1,42	1,50	1,11	1,43	1,47	1,57	1,51	1,33	1,34	1,05	1,30	0,91	0,62	0,80	0,94	0,95	MT	MT
FR/03	1,25	1,33	1,30	0,87	0,84	0,98	0,75	0,79	0,88	0,94	1,08	0,91	0,80	0,99	1,05	SD	SD	SD	SD	SD
FR/04	1,05	1,07	1,11	1,00	0,64	0,52	0,40	0,38	0,53	0,49	0,44	0,42	0,51	0,44	0,50	0,48	MT	MT	MT	MT
*FR/05	1,08	1,12	1,13	1,16	1,20	1,19	1,15	1,09	1,08	0,85	0,83	0,81	0,78	0,75	0,74	0,75	0,76	0,72	0,75	N/D
FR/06	0,96	0,97	0,78	0,66	0,89	0,85	0,71	0,84	1,04	0,96	0,70	0,78	0,41	0,72	0,65	0,51	1,15	1,52	1,76	SD
FR/07	1,79	1,38	1,21	1,01	0,92	1,38	1,18	1,49	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	9,06	8,85	8,39	7,36	6,25	6,77	6,42	6,78	5,63	5,22	5,04	5,00	5,12	4,92	4,04	3,22	3,75	3,98	3,18	0,73
Germany																				
DE/01	1,61	1,61	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*DE/02	1,33	1,04	1,68	1,04	1,04	1,03	0,89	0,68	0,68	0,60	0,56	0,52	0,43	0,60	0,47	SD	SD	SD	SD	SD
*DE/03	1,98	0,32	0,51	0,55	0,57	0,59	0,69	0,64	0,67	0,65	0,70	0,37	0,34	0,37	0,38	0,41	0,52	0,49	0,40	0,35
*DE/04	1,18	1,18	1,18	1,15	1,79	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/05	1,70	1,70	1,00	0,97	0,94	1,02	1,04	0,98	0,90	0,85	0,86	0,86	0,86	0,82	0,68	0,60	0,54	0,45	0,45	0,23
*DE/06	0,71	0,51	0,39	0,32	0,30	0,48	0,75	0,40	0,32	0,47	0,61	0,71	0,67	0,42	0,49	0,39	SD	SD	SD	SD
*DE/07	1,42	1,67	1,34	1,06	1,17	1,57	1,41	1,03	0,95	1,09	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/08	0,70	1,79	1,26	1,32	1,04	0,83	0,84	1,04	1,04	1,02	0,82	0,81	0,80	0,50	0,50	0,50	0,35	0,34	0,34	0,34
*DE/09	1,00	1,00	0,94	1,11	1,13	1,22	1,40	1,39	1,17	0,95	0,81	1,09	0,87	0,70	0,69	0,80	0,82	0,82	MT	MT
DE/10	0,95	1,54	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	2,10	1,66	1,85	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	0,62	0,76	0,82	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*DE/13	0,80	0,83	0,99	1,11	0,90	0,84	0,82	0,89	0,92	0,92	0,65	0,87	MT	MT	MT	MT	MT	MT	MT	MT
DE/14	1,43	1,33	1,33	0,90	0,79	0,76	0,73	0,65	0,65	0,62	0,52	0,48	MT	MT	MT	MT	MT	MT	MT	MT
DE/15	1,40	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	18,93	16,93	13,27	9,52	9,67	8,34	8,56	7,70	7,31	7,17	5,52	5,71	3,97	3,41	3,21	2,69	2,24	2,10	1,19	0,92
Netherlands																				
*NL/01	0,87	0,93	0,87	0,72	0,50	0,56	0,54	0,56	0,55	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*NL/02	1,30	1,27	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	2,17	2,20	0,87	0,72	0,50	0,56	0,54	0,56	0,55	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Portugal																				
*P/01	1,90	1,90	1,90	1,60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*P/02	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	1,90	1,90	1,90	1,60	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Spain																				
ES/01	0,96	1,26	1,42	1,14	1,04	1,22	1,27	1,03	0,97	0,82	0,62	0,68	0,65	0,59	0,65	0,61	NI	MT	MT	MT
*ES/02	1,43	1,33	1,27	1,15	1,17	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
*ES/03	1,96	1,51	1,28	0,96	0,69	0,93	0,69	0,63	0,64	0,50	0,49	0,45	0,43	0,41	0,40	0,40	0,40	0,40	0,42	0,40
ES/04	1,40	1,45	0,78	0,46	0,54	0,76	0,70	0,67	0,62	0,61	0,59	0,44	0,37	0,35	0,32	0,30	0,34	0,34	0,27	0,28
*ES/05	1,73	1,44	1,35	1,46	1,23	1,00	1,18	0,60	0,33	0,31	0,41	0,43	0,29	0,35	0,48	0,42	0,40	0,36	0,36	0,84
ES/06	0,60	0,75	0,76	0,82	0,78	0,84	0,89	0,86	0,67	0,66	0,38	0,41	0,46	0,39	0,30	0,36	0,37	0,36	0,37	0,31
ES/07	1,90	1,40	1,06	0,88	1,12	1,04	0,88	0,89	0,88	0,86	0,71	0,70	MT	MT	MT	MT	MT	MT	MT	MT
ES/08	1,50	1,68	1,51	1,14	1,10	1,12	0,95	0,87	0,86	0,75	0,60	0,51	0,46	0,42	0,44	0,41	0,43	0,43	0,43	0,51
*ES/09	1,22	1,50	0,74	0,83	1,11	0,80	0,84	0,93	0,59	0,62	0,61	0,45	0,57	0,39	0,41	0,40	0,36	0,36	0,42	0,65
Total	12,70	12,32	10,17	8,84	8,77	7,70	7,39	6,48	5,56	5,13	4,41	4,07	3,23	2,90	3,00	2,88	2,28	2,25	2,27	3,00
Sweden																				
*SE/01	0,38	0,25	0,25	0,27	0,23	0,20	0,23	0,17	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*SE/02	0,18	0,14	0,13	0,14	0,12	0,14	0,17	0,15	0,16	0,15	0,17	0,13	0,13	0,12	0,14	0,14	0,13	0,13	0,14	0,16
Total	0,56	0,39	0,38	0,41	0,36	0,34	0,40	0,32	0,16	0,15	0,17	0,13	0,13	0,12	0,14	0,14	0,13	0,13	0,14	0,16
Switzerland																				
*CH/01	1,03	1,37	1,15	1,07	1,26	1,18	1,18	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/02	NI	0,85	0,71	1,02	0,67	0,69	0,41	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*CH/03	0,78	0,37	0,52	0,63	0,52	0,32	0,65	0,82	0,99	0,55	0,62	0,40	0,51	0,49	0,78	0,64	0,84	1,12		MT
Total	1,81	2,59	2,37	2,71	2,44	2,18	2,23	0,82	0,99	0,55	0,62	0,40	0,51	0,49	0,78	0,64	0,84	1,12	0,00	0,00
United Kingdom																				

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
*UK/01	0,48	0,47	0,46	0,45	0,44	1,00	1,67	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*UK/02	1,18	1,31	1,52	1,66	1,88	1,52	1,64	1,45	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
*UK/03	1,50	1,75	1,72	1,72	1,42	1,43	1,37	1,30	1,79	2,39	2,59	1,47	1,78	1,52	0,94	1,10	1,08	0,90	SD	SD
Total	3,16	3,53	3,70	3,83	3,74	3,95	4,68	2,74	1,79	2,39	2,59	1,47	1,78	1,52	0,94	1,10	1,08	0,90	0,00	0,00

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

SD: Shutdown

Table 6: Mercury in Safely Deposited Wastes* (kg per year)

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Belgium																					
BE/01	3784	837	6823	260	2889	2293	4608	5405	304	1928	367	0	1076	1311	2073	SD	SD	SD	SD	SD	
BE/02	4512	5733	3566	4646	358	NI	250	5949	1139	3802	2702	6723	2003	1615	2329	205	5456	2175	2918	1673	
BE/03	1	3	5	6	67	6	5	3	6	3	0	3	4	109	3	4	5	6	2	SD	
BE/04	105	0	2	1242	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total	8402	6573	10396	6154	3314	2299	4863	11357	1449	5733	3069	6726	3083	3035	4405	209	5461	2181	2920	1673	
Finland																					
SFR/01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1814	NI	N/A	N/A	N/A	N/A
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1814	0	N/A	N/A	N/A	N/A
France																					
FR/01	42	0	0	0	18	33	75	17	0	0	0	0	0	0	0	4	0	6	472	0	
FR/02	47	68	2632	9644	8896	6230	7268	7309	10428	4858	7156	3876	7041	7291	7203	13993	9213	7129	MT	MT	
FR/03	1298	1257	1296	1078	922	1323	1143	1423	2106	1066	1268	1090	1062	1229	1770	SD	SD	SD	SD	SD	
FR/04	207	54	37	43	41	34	26	34	0	20	34	0	0	0	556	5	MT	MT	MT	MT	
FR/05	250	0	70	6	238	13	3	NI	2	3	3	3	0	80	90	811	2340	2225	0	N/D	
FR/06	25	33	16	64	48	25	15	9	18	18	0	6	9	10	5	5	38	7	10	SD	
FR/07	33	24	35	8	25	24	44	32	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	
Total	1902	1436	4086	10843	10188	7682	8574	8824	12554	5965	8461	4975	8112	8610	9624	14818	11591	9367	482	0	

* All mercury-contaminated materials, such as cell components, process equipment, solid wastes from sumps, pits, demercurisation units and the brine purification process, which have been sent to authorised and properly controlled toxic waste disposal sites, are to be included in the category "safely deposited waste". For the purpose of the balance, all deposits of mercury in whatever concentrations should be accounted for.

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Germany																				
DE/01	47	31	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/02	28	4	0	NI	NI	NI	138	182	120	85	65	13	91	65	15	SD	SD	SD	SD	SD
DE/03	2519	2	3	2	1	NI	NI	NI	3	207	223	4	3	3	4	17	0	0	0	0
DE/04	1806	3054	3054	1259	3437	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/05	411	66	576	766	5799	10555	10027	4958	1762	2514	855	0	454	0	415	21874	0	11583	11583	11269
DE/06	2180	1314	3764	1034	472	1591	1551	496	1386	5602	1726	2987	1607	4376	2471	2373	SD	SD	SD	SD
DE/07	12594	37260	20602	13200	13390	12260	16490	15330	59991	55830	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/08	1	1646	2311	NI	674	2282	1536	356	358	553	431	804	961	916	717	3708	1235	958	2368	842
DE/09	1480	2270	4570	4230	6366	5340	4355	3239	3241	0	2324	4401	4538	2492	0	0	28	0	MT	MT
DE/10	136	304	NI	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	196	19	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	229	176	176	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/13	3547	2692	5659	9209	4378	2745	2500	2780	2309	1888	120109	5058	MT	MT	MT	MT	MT	MT	MT	MT
DE/14	1064	1656	754	833	406	85	212	71	96	72	6289	2862	MT	MT	MT	MT	MT	MT	MT	MT
DE/15	1720	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	27958	50494	41469	30533	34923	34858	36809	27412	69266	66751	132022	16129	7654	7852	3622	27972	1263	12541	13951	12111
Netherlands																				
NL/01	38	6	2	28	7	3	2	1	0	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
NL/02	0	0	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	38	6	2	28	7	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Portugal																				
P/01	615	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
P/02	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	615	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain																				
ES/01	84	1265	4276	495	2027	846	408	1297	807	1107	627	1807	904	1102	590	1150	0	MT	MT	MT
ES/02	48	27	8	9	141	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
ES/03	411	384	599	359	472	679	402	323	370	376	373	471	885	696	706	361	160	299	225	264
ES/04	2208	2694	6279	4868	2343	2020	2837	3549	3938	2899	3147	3802	1898	1894	2316	1007	897	897	1877	2124
ES/05	1	1013	412	59	0	440	1544	1880	208	161	44	514	232	195	294	210	153	162	183	6401
ES/06	496	604	770	1088	2339	2625	622	900	1043	3776	906	940	1109	2497	758	925	6242	2997	9951	10025
ES/07	20	20	10	3	13	14	NI	315	9	11	0	219	MT	MT	MT	MT	MT	MT	MT	MT
ES/08	379	498	432	459	552	328	506	633	551	1035	652	490	424	343	1188	2126	1218	11148	7790	17975
ES/09	197	500	401	279	169	349	185	217	156	1105	1220	500	2350	664	684	780	568	0	72	32
Total	3844	7005	13187	7619	8056	7301	6504	9114	7082	10470	6969	8743	7802	7391	6536	6559	9238	15503	20098	36821
Sweden																				
SE/01	0	6	6	850	5	NI	55	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
SE/02	2	1	1	1	NI	NI	NI	NI	NI	0	0	0	4238	4682	0	0	0	1	0	0
Total	2	7	7	851	5	0	55	0	0	0	0	0	4238	4682	0	0	0	1	0	0
Switzerland																				
CH/01	327	165	178	215	207	239	139	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/02	NI	0	3	32	1	2	1	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/03	1073	1084	0	1933	NI	1891	NI	1859	0	1948	1787	1074	1865	0	1953	833	973	1618	0	MT
Total	1400	1249	181	2180	208	2132	140	1859	0	1948	1787	1074	1865	0	1953	833	973	1618	0	0

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
United Kingdom																				
UK/01	140	161	268	263	136	118	246	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/02	17	37	48	147	113	119	134	43	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/03	3032	3911	3092	2842	10745	21247	6208	6446	15905	11703	1659	2315	2485	5313	1596	5019	2954	3659	SD	SD
Total	3189	4109	3408	3252	10994	21484	6588	6489	15905	11703	1659	2315	2485	5313	1596	5019	2954	3659	0	0

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

SD: Shutdown

Table 7: Mercury in Safely Deposited Wastes* (g per tonne production capacity)

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium																				
BE/01	17,28	3,64	31,16	1,19	13,19	10,47	21,04	24,68	1,39	8,80	1,68	0,00	5,98	7,29	12,41	SD	SD	SD	SD	SD
BE/02	18,05	22,93	14,26	18,59	1,43	NI	1,00	23,79	5,01	18,55	13,18	32,80	9,77	7,88	11,36	1,00	26,62	10,61	14,23	8,00
BE/03	0,01	0,03	0,04	0,05	0,06	0,05	0,04	0,03	0,05	0,02	0,00	0,03	0,04	0,99	0,03	0,03	0,05	0,05	0,02	SD
BE/04	1,16	0,00	0,03	29,82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Finland																				
SFR/01	0,01	0,00	0,00	0,01	0,00	NI	NI	NI	NI	0,01	0,01	0,00	0,00	0,00	45,34	NI	N/A	N/A	N/A	N/A
France																				
FR/01	2,34	0,00	0,00	0,00	1,02	1,81	4,13	0,95	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,23	0,00	0,36	26,15	0,00
FR/02	0,65	0,95	36,56	133,94	123,56	86,53	100,95	101,51	144,83	67,47	99,39	53,83	97,79	101,26	100,04	194,35	127,96	99,01	MT	MT
FR/03	5,39	5,22	5,38	4,47	3,83	5,49	4,75	5,91	8,74	4,42	5,26	4,53	4,42	5,12	7,97	SD	SD	SD	SD	SD
FR/04	1,22	0,32	0,22	0,26	0,24	0,20	0,16	0,20	0,00	0,12	0,20	0,00	0,00	0,00	4,36	0,05	MT	MT	MT	MT
FR/05	11,10	0,00	3,10	0,28	10,58	0,60	0,14	NI	0,11	0,16	0,15	0,14	0,00	3,55	4,00	36,04	103,99	98,88	0,00	N/D
FR/06	0,15	0,20	0,09	0,39	0,29	0,15	0,09	0,05	0,11	0,11	0,00	0,04	0,06	0,06	0,03	0,03	0,23	0,04	0,06	SD
FR/07	0,18	0,13	0,19	0,04	0,13	0,13	0,24	0,17	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Germany																				
DE/01	0,68	0,48	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/02	0,20	0,03	0,00	0,00	NI	NI	1,25	1,40	0,92	0,65	0,50	0,10	0,70	0,50	0,50	SD	SD	SD	SD	SD

* All mercury-contaminated materials, such as cell components, process equipment, solid wastes from sumps, pits, demercurisation units and the brine purification process, which have been sent to authorised and properly controlled toxic waste disposal sites, are to be included in the category "safely deposited waste". For the purpose of the balance, all deposits of mercury in whatever concentrations should be accounted for.

Mercury losses from the chlor-alkali industry in 2017

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
DE/03	20,15	0,01	0,02	0,01	0,01	NI	NI	NI	0,02	1,65	1,78	0,03	0,03	0,02	0,03	0,14	0,00	0,00	0,00	0,00
DE/04	6,02	10,18	10,18	4,20	22,46	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/05	2,57	0,44	3,60	4,79	36,24	66,00	62,67	29,96	10,37	14,79	5,03	0,00	2,67	0,00	2,44	128,67	NI	66,30	66,30	64,00
DE/06	16,77	10,10	25,29	6,95	3,17	11,00	10,42	3,33	9,32	37,64	11,60	20,07	10,80	29,40	16,60	29,37	SD	SD	SD	SD
DE/07	69,20	207,00	113,20	75,00	76,08	70,00	93,69	87,10	306,77	766,78	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/08	0,01	16,80	17,00	0,00	4,96	17,00	11,30	2,62	2,63	4,06	3,17	5,85	6,99	6,67	5,22	24,72	8,99	6,97	17,24	6,00
DE/09	8,71	15,13	28,56	25,33	38,12	32,00	26,08	19,40	19,41	0,00	13,92	26,35	27,18	14,92	0,00	0,00	0,17	0,00	MT	MT
DE/10	0,55	1,23	NI	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	6,13	0,31	0,00	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	1,46	1,12	1,12	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/13	22,17	17,95	35,37	57,56	27,36	17,00	15,63	17,38	14,43	11,80	750,68	128,99	MT	MT	MT	MT	MT	MT	MT	MT
DE/14	12,92	23,00	9,15	10,11	4,94	1,00	2,57	0,86	1,16	0,88	76,37	69,50	MT	MT	MT	MT	MT	MT	MT	MT
DE/15	8,60	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Netherlands																				
NL/01	0,51	0,08	0,03	0,38	0,10	0,04	0,03	0,01	0,00	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
NL/02	0,00	0,00	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Portugal																				
P/01	14,20	0,00	0,00	0,00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P/02	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Spain																				
ES/01	2,64	42,15	136,30	15,76	64,60	27,00	13,00	41,35	25,73	35,29	19,99	57,60	28,80	35,12	18,82	36,64	NI	MT	MT	MT
ES/02	3,23	1,80	0,56	0,61	14,30	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ES/03	12,26	11,46	17,85	10,70	14,06	20,00	11,98	9,62	11,03	11,21	11,12	14,04	26,38	20,75	21,04	10,75	4,77	8,90	6,70	8,00
ES/04	14,71	17,96	41,86	32,45	15,62	13,00	18,91	23,66	26,26	19,33	20,98	25,34	16,48	16,44	20,10	11,49	11,44	11,44	23,93	27,00
ES/05	0,01	16085,00	6,56	0,94	0,01	7,00	24,61	29,96	3,32	2,57	0,70	8,19	3,70	3,10	4,69	3,35	2,44	2,58	2,91	102,00
ES/06	2,37	2,89	3,53	4,99	10,74	12,00	2,86	4,13	4,79	17,33	4,16	4,32	5,09	11,46	3,48	4,25	28,68	13,77	45,72	46,00
ES/07	0,80	0,80	0,38	0,12	0,53	1,00	NI	12,60	0,36	0,44	0,00	20,99	MT	MT	MT	MT	MT	MT	MT	MT
ES/08	2,81	3,69	3,20	3,40	4,09	2,00	3,75	4,69	4,08	7,67	4,83	3,63	3,14	2,54	8,80	15,75	9,02	82,58	57,70	133,00
ES/09	1,95	4,95	3,97	2,77	1,67	3,00	1,83	2,15	1,55	10,95	12,09	4,95	49,47	13,99	14,40	16,43	11,96	0,00	1,52	1,00
Sweden																				
SE/01	0,00	0,06	0,06	8,50	0,05	NI	0,55	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
SE/02	0,02	0,01	0,01	0,01	NI	NI	NI	NI	0,00	0,00	0,00	8,95	35,32	39,02	0,00	0,00	0,00	0,01	0,00	0,00
Switzerland																				
CH/01	5,95	3,00	3,23	3,90	3,77	4,35	4,35	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/02	NI	0,00	0,10	1,22	0,02	0,06	0,03	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/03	40,49	40,91	0,00	71,60	NI	70,05	NI	68,84	0,00	72,16	66,20	0,00	69,09	0,00	72,35	30,85	36,70	61,05	NI	MT
United Kingdom																				
UK/01	4,75	5,54	9,12	8,94	4,63	4,00	8,36	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/02	0,19	0,42	0,53	1,64	1,26	1,33	1,49	0,57	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/03	4,11	5,30	4,19	3,85	14,56	28,79	8,41	8,73	21,55	31,89	4,52	6,69	8,97	19,18	5,76	18,12	10,66	13,21	SD	SD

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

SD: Shutdown

4. 2017 National data and information

4.1 Introduction

In this part of the report, data and information about the national chlor-alkali industry of each OSPAR Contracting Party is given as follows:

- a. Contracting Parties with mercury-based chlor-alkali plants:
 - (i) one overview map showing the location and status of the sites;
 - (ii) tables with technical data on the annual discharges, emissions and losses, including wastes, from plants of each Contracting Party (provided via Euro Chlor);
- b. Contracting Parties with mercury-free plants or without chlor-alkali industry.

The column headings and abbreviations (*e.g.* C, E1, E2 etc) used in the tables correspond to the reporting requirements set out in OSPAR Agreement number 2003-5.

Sea Area - Sea area in which liquid wastes from the plant is discharged, or is likely to be discharged

OSPAR maritime area

A - Atlantic

Areas not covered by the OSPAR Convention

Baltic - Baltic Sea

Bl Sea - Black Sea

M - Mediterranean Sea

Brine W - waste brine plant

R - brine-recirculation plant

Values are expressed in continental notation.

4.2 Locations of mercury-based chlor-alkali plants

The following tables give an overview of the location and status of the mercury-based chlor-alkali plants and their operators:

Country/Code	Company	Location	Status
Belgium			
BE/1	Solvin	Lillo	Shutdown 2013
BE/2	Tessengerlo	Tessengerlo	Active
BE/3	Solvin	Antwerpen	Shutdown 2017
BE/4	Solvay	Jemeppe	Replaced its mercury technology in 2001
Finland			
SFR/1	Eka Chemicals	Oulu	The permitted discharges and emissions have been increased on the basis of a revised authorisation in 2002
France			
FR/1	PC de Loos	Loos	Active
FR/2	Albemarle PPC	Thann	Converted to membrane technology
FR/3	Solvay	Tavaux	Shutdown in 2012
FR/4	Arkema	Jarrie	Converted to membrane technology
FR/5	SPC Harbonnières	Harbonnières	Active
FR/6	Arkema	Lavera	Shutdown 2017
FR/7	Arkema	St Auban	Shutdown 2006
Germany			
DE/1	ECI	Bitterfeld	Shutdown in 1999
DE/2	Bayer	Uerdingen	Shutdown in 2012
DE/3	Akzo Nobel	Ibbenbüren	Active
DE/4	Bayer	Leverkusen	Shutdown in 2002
DE/5	BASF	Ludwigshafen	Active
DE/6	Ineos	Wilhelmshafen	Shutdown in 2013
DE/7	Vestolit	Marl	Shut down of some cells in 2001. Only the period of time in production before the definitive shut down considered. Converted to membrane technology during 2007.

Mercury losses from the chlor-alkali industry in 2017

Country/Code	Company	Location	Status
DE/8	Evonik	Lülsdorf	Active
DE/9	Akzo Nobel	Frankfurt	Converted to membrane technology
DE/10	Bayer	Dormagen	Ceased operation in 1999
DE/11	Clariant	Gersthofen	Shutdown in 2000
DE/12	Wacker Chemie	Burghausen	Shutdown in 2000
DE/13	Vinnolit	Knapsack	Converted to membrane technology during 2009
DE/14	Vinnolit	Gendorf	Converted to membrane technology during 2009
DE/15	BSL Olefinverbund	Schkopau	Shutdown in 1998
The Netherlands			
NL/1	Akzo Nobel	Hengelo	Shutdown in 2007
NL/2	Solvay	Linne-Herten	Shutdown in 1999
Portugal			
P/1	Uniteca	Estarreja	Has been replaced by membrane cells in January 2002
P/2	Solvay Portugal	Póvoa de Santa Iria	Shutdown in 1998
Spain			
ES/1	Quimica del Cinca	Monzon	Converted to membrane technology
ES/2	Electroquimica de Hernani	Hernani	Partly converted to membrane technology
ES/3	Elnosa	Lourizan	Active
ES/4	Ercros	Flix	Active
ES/5	Solvay	Torrelavega	Active
ES/6	Solvin	Martorell	Active
ES/7	Ercros	Sabinanigo	Converted to membrane technology in 2009
ES/8	Ercros	Vilaseca	Active
ES/9	Ercros	Huelva/Palos	Active
Sweden			
SE/1	Akzo Nobel	Bohus	Shutdown in 2006
SE/2	Ineos	Stenungsund	Active
Switzerland			

Country/Code	Company	Location	Status
CH/1	Solvay	Zurzach	Shutdown in 2004
CH/2	Syngenia	Monthey	Shutdown in 2005
CH/3	SF-Chem	Pratteln	Converted to membrane technology
United Kingdom			
UK/1	Rhodia	Staveley	Shutdown in 2005
UK/2	Albion Chemicals	Sandbach	Shutdown in 2006
UK/3	Ineos	Runcorn	Shutdown in 2016

The status of the chlor-alkali industry within other OSPAR Contracting Parties than those listed in the table above is as follows:

Denmark

Denmark has no chlor-alkali plants.

Iceland

Iceland has no chlor-alkali plants.

Ireland

Ireland has only one chlor-alkali plant, which operates mercury-free.

Luxembourg

Luxembourg has no chlor-alkali plants.

Norway

The last Norwegian plant with mercury cells ceased its mercury-based operations in September 1997.

Mercury losses from the chlor-alkali industry in 2017

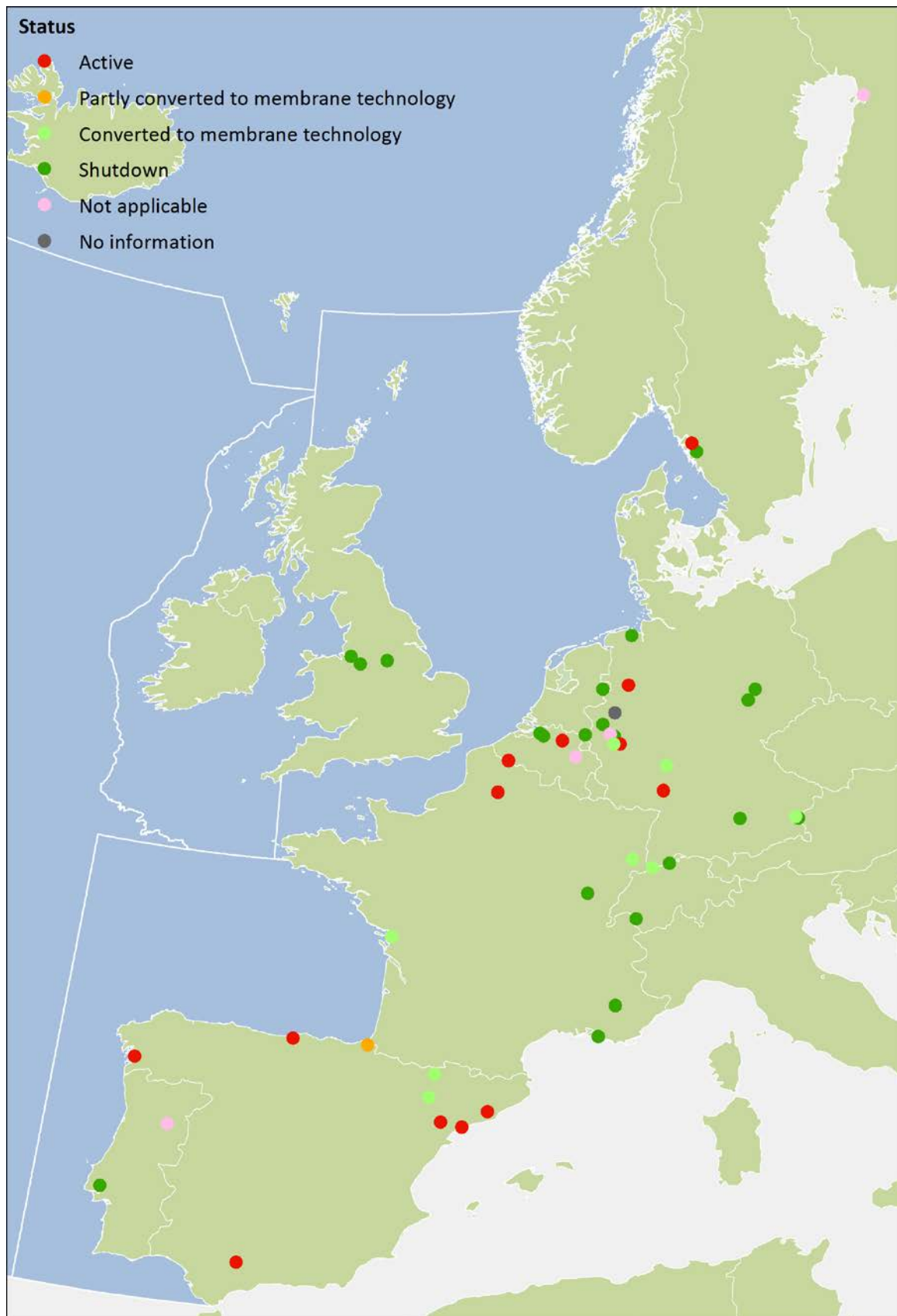


Figure 4: Map showing the location and status of the mercury-based chlor-alkali plants in the OSPAR Maritime Area (<https://odims.ospar.org/>)

Mercury losses data per Contracting Party on a plant-by-plant basis

Belgium

Site	Chlorine production capacity with Hg-cells (tonnes)	Sea area	Brine W or R	Mercury consumption C (g/t)	Losses via products E1 (g/t)	Discharges via waste water E2 (g/t)	Emissions to the atmosphere			Total emissions Discharges losses (g/t)	Mercury in Wastes					Difference to balance DB (g/t)
							Process exhaust 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
BE02	205000	A	R	10,98	0,04	0,02	0,001	0,70	0,70	0,76	8,16	-0,95	1,37	0,00	2,06	0,00
Total	205000															

Draft Mercury losses from the chlor-alkali industry in 2017

France

Site	Chlorine production capacity with Hg-cells (tonnes)	Sea area	Brine W or R	Mercury consumption C (g/t)	Losses via products E1 (g/t)	Discharges via waste water E2 (g/t)	Emissions to the atmosphere			Total emissions Discharges losses (g/t)	Mercury in Wastes					Difference to balance DB (g/t)
							Process exhaust 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
FR/1	18040	A	R	25,44	0,03	0,03	0,015	0,65	0,73	0,80	0,00	-0,95	1,11	0,00	8,81	15,90
FR/5	22500	A	R	No data received												
Total	40540															

Germany

Site	Chlorine production capacity with Hg-cells (tonnes)	Sea area	Brine W or R	Mercury consumption C (g/t)	Losses via products E1 (g/t)	Discharges via waste water E2 (g/t)	Emissions to the atmosphere			Total emissions Discharges losses (g/t)	Mercury in Wastes					Difference to balance DB (g/t)
							Process exhaust	Cellroom	Total		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
							2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)							
DE/3	125276	A	R	23,11	1,03	0,00	0,005	0,34	0,35	1,38	0,00	0,37	0,00	0,00	3,40	18,33
DE/5	174711	A	R	-45,79	0,03	0,01	0,000	0,23	0,23	0,27	64,50	0,00	2,84	0,00	16,24	-126,79
DE/8	137400	A	R	8,05	0,08	0,03	0,009	0,33	0,34	0,45	6,13	-0,32	0,00	0,00	-2,31	3,78
Total	437387															

Draft Mercury losses from the chlor-alkali industry in 2017

Spain

Site	Chlorine production capacity with Hg-cells (tonnes)	Sea area	Brine W or R	Mercury consumption C (g/t)	Losses via products E1 (g/t)	Discharges via waste water E2 (g/t)	Emissions to the atmosphere			Total emissions Discharges losses (g/t)	Mercury in Wastes					Difference to balance DB (g/t)
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
							2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)		D (g/t)	c (tonnes)	f (tonnes)	I (tonnes)	F (g/t)	
ES/3	33552	A	R	17,97	0,07	0,01	0,009	0,39	0,40	0,48	7,88	0,00	0,00	0,00	-0,03	9,64
ES/4	78434	M	R	36,34	0,02	0,02	0,003	0,28	0,28	0,32	27,08	0,00	0,00	0,00	-0,06	8,99
ES/5	62747	A	W	293,83	0,15	0,05	0,000	0,84	0,84	1,03	102,01	-0,53	11,59	0,00	176,36	14,43
ES/6	217653	M	R	75,66	0,02	0,02	0,035	0,28	0,31	0,35	46,06	-0,02	0,47	3,66	19,99	9,26
ES/8	135000	M	R	141,16	0,12	0,06	0,045	0,47	0,51	0,69	133,15	-2,96	0,00	0,00	-23,29	30,61
ES/9	47496	A	R	17,65	0,05	0,02	0,003	0,65	0,65	0,72	0,68	0,00	0,00	0,00	0,00	16,25
	574882															

Sweden

Site	Chlorine production capacity with Hg-cells (tonnes)	Sea area	Brine W or R	Mercury consumption C (g/t)	Losses via products E1 (g/t)	Discharges via waste water E2 (g/t)	Emissions to the atmosphere			Total emissions Discharges losses (g/t)	Mercury in Wastes					Difference to balance DB (g/t)
							Process exhaust	Cellroom	Total		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
							2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)							
SE/2	120000	A	R	0,73	0,01	0,00	0,000	0,16	0,16	0,16	0,00	0,00	0,43	0,00	3,54	-2,97
Total	120000															



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