



## Mercury losses from the Chlor-alkali industry in 2012

### **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.

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## Executive summary

This report presents the 2012 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 2010 to 2012 due to the partial or full conversion of plants to membrane technology.

Mercury losses through product, waste water and air have decreased about 18,0% from 2010 to 2012, following the decreasing trend since the mid 1990's. A large part of the decrease is due to the conversion of plants to membrane technology or the shut-down of plants. However, a majority of plants have also managed to further decrease their specific emissions without reducing their mercury-based capacities.

Over the years, atmospheric emissions of mercury have been significantly reduced. Significant reductions are reported from a number of countries leading to a total of about 19,2% reduction from 2010 to 2012, although a few notify increases in emissions. All plants now comply with the limit value of 2 g Hg/t Cl<sub>2</sub> for air emissions in PARCOM Decision 90/3.

The amount of mercury in safely deposited wastes has decreased. Some countries report increases and others decreases but these changes do not necessarily correlate to the shutdown of cells or plants. More detailed information to explain year-to-year differences in the amount of mercury in safely deposited wastes is needed.

Altogether the reported figures show clearly the results of the efforts, which have been achieved since the last assessment in 2013. Chlorine production capacity with mercury cells fell by 0,06% from 2011 to 2012 in the OSPAR maritime area. Over the same period, mercury losses through product, waste water and air and atmospheric emissions of mercury were reduced by 12%.

## Récapitulatif

Ce rapport présente les données 2012 sur les capacités de production, les émissions atmosphériques du mercure et la quantité de mercure dans les déchets mis en décharges sécurisées.

Du fait de la conversion partielle et complète à la technique à membrane, les capacités de production de chlore à base de cellules de mercure ont continué de décroître de 2010 à 2012.

Les pertes de mercure dans les produits, l'eau usée et l'air ont diminué d'environ 18,0 % entre 2010 et 2012, suivant la tendance à la baisse des années 90s. Ceci est dû en grande partie à la conversion des usines à la technique à membrane ou à la fermeture d'usines. Cependant un grand nombre d'usines sont arrivés à diminuer davantage leurs émissions s'y rapportant sans toutefois réduire leurs capacités à base de cellules de mercure.

Au cours des années, les émissions atmosphériques de mercure ont diminué de manière significative. Alors que bien des pays notifient des réductions significatives dont le cumul représente une réduction d'environ 19,2 % entre 2010 et 2012, d'autres notifient une augmentation d'émissions. Toutes les usines se conforment à la valeur limite de 2 g Hg/t Cl<sub>2</sub> pour les émissions atmosphériques de la Décision PARCOM 90/3.

La quantité de mercure dans les déchets mis en décharges sécurisées a diminué. Certains pays notifient des augmentations et d'autres des diminutions mais ces modifications ne correspondent pas nécessairement à la fermeture de cellules ou d'usines. Il est nécessaire d'obtenir des informations plus détaillées permettant d'expliquer les différences que présente, d'une année à l'autre, la quantité de mercure dans les déchets mis en décharges sécurisées.

Dans l'ensemble les chiffres notifiés montrent clairement les résultats des efforts qui ont été réalisés depuis la dernière évaluation en 2013. La capacité de production de chlore à base des cellules de mercure a diminué de 0,06 % entre 2011 et 2012 dans la zone de la Convention. Au cours de la même période, les pertes de mercure dans les produits, les eaux usées et l'air et les émissions atmosphériques de mercure ont diminué de plus de 12 %.

# 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 the light of the ongoing work under the Commission as regards 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 in form of 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 two 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 2012 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 2012 report on mercury losses from the chlor-alkali industry

The 2012 data will be assessed together with the 2013 data and will be published in 2015.

## 3. Evolution of mercury losses from the chlor-alkali industry (1982 - 2012)

The following figures give a rough indication of the evolution of mercury losses from the chlor-alkali industry in the period 1982-2012 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;
- 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 has been published in Figures 1 to 3 as total figures for each Contracting Party. Since 1998, data has been made available on a plant-by-plant basis<sup>1</sup>. In order to improve comparability of performance, plant-by-plant data are now published in:

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

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<sup>1</sup> For plant codes in the tables see section 4.2.

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)

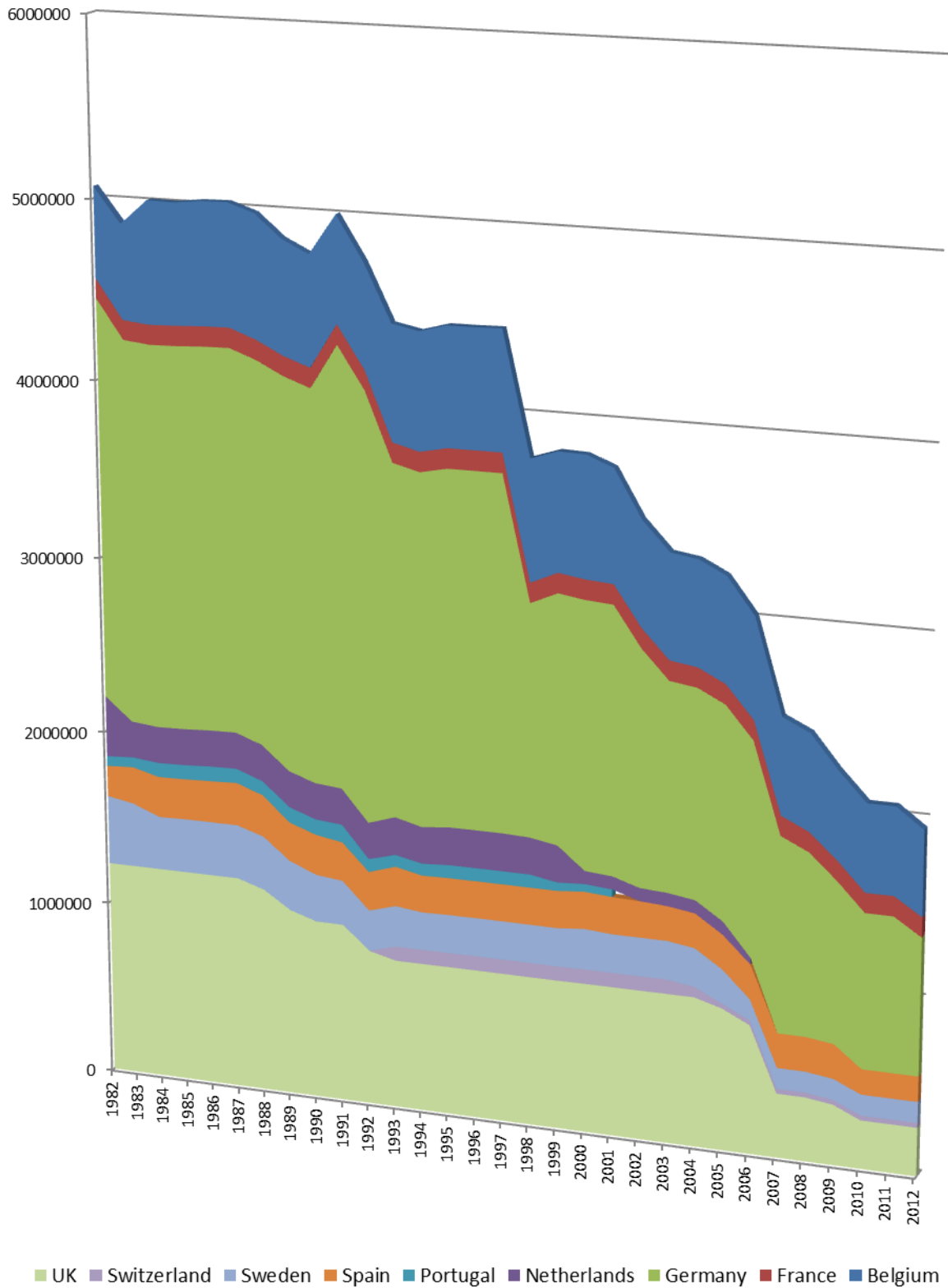
Table 7: Mercury in Safely Deposited Wastes (g per tonne production capacity)

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.

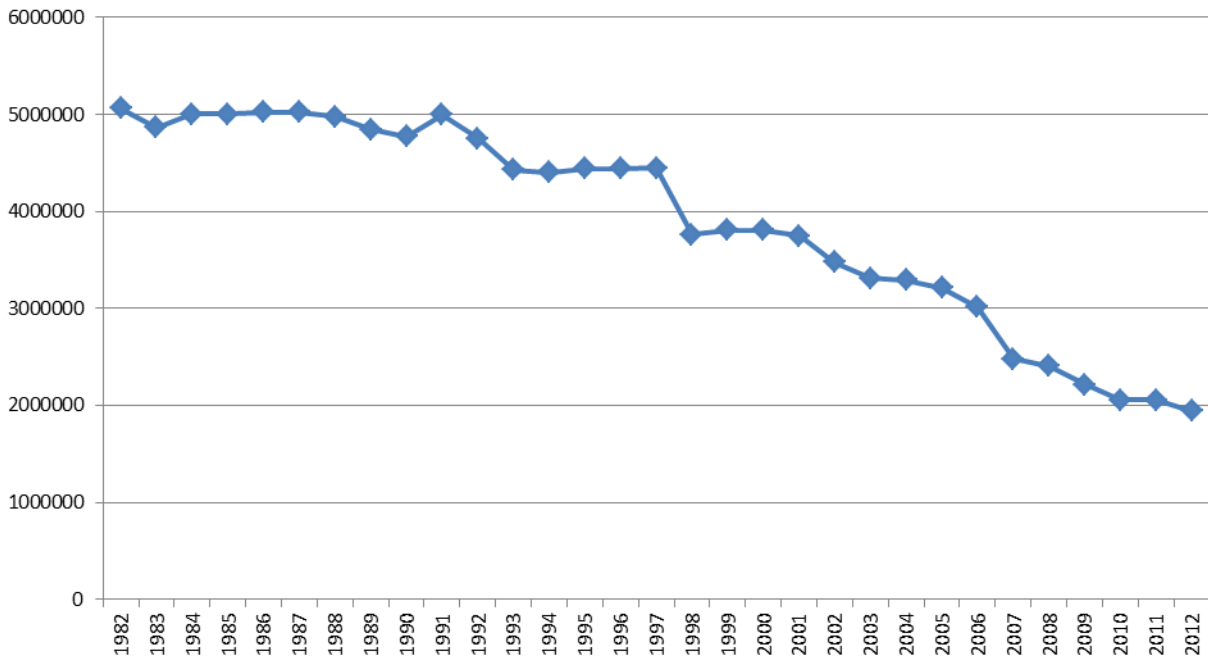
To this end, all locations of mercury-based chlor-alkali plants in operation in 1998 are described in Section 4.2 including when they have been decommissioned or converted.

Mercury losses from the chlor-alkali industry in 2012



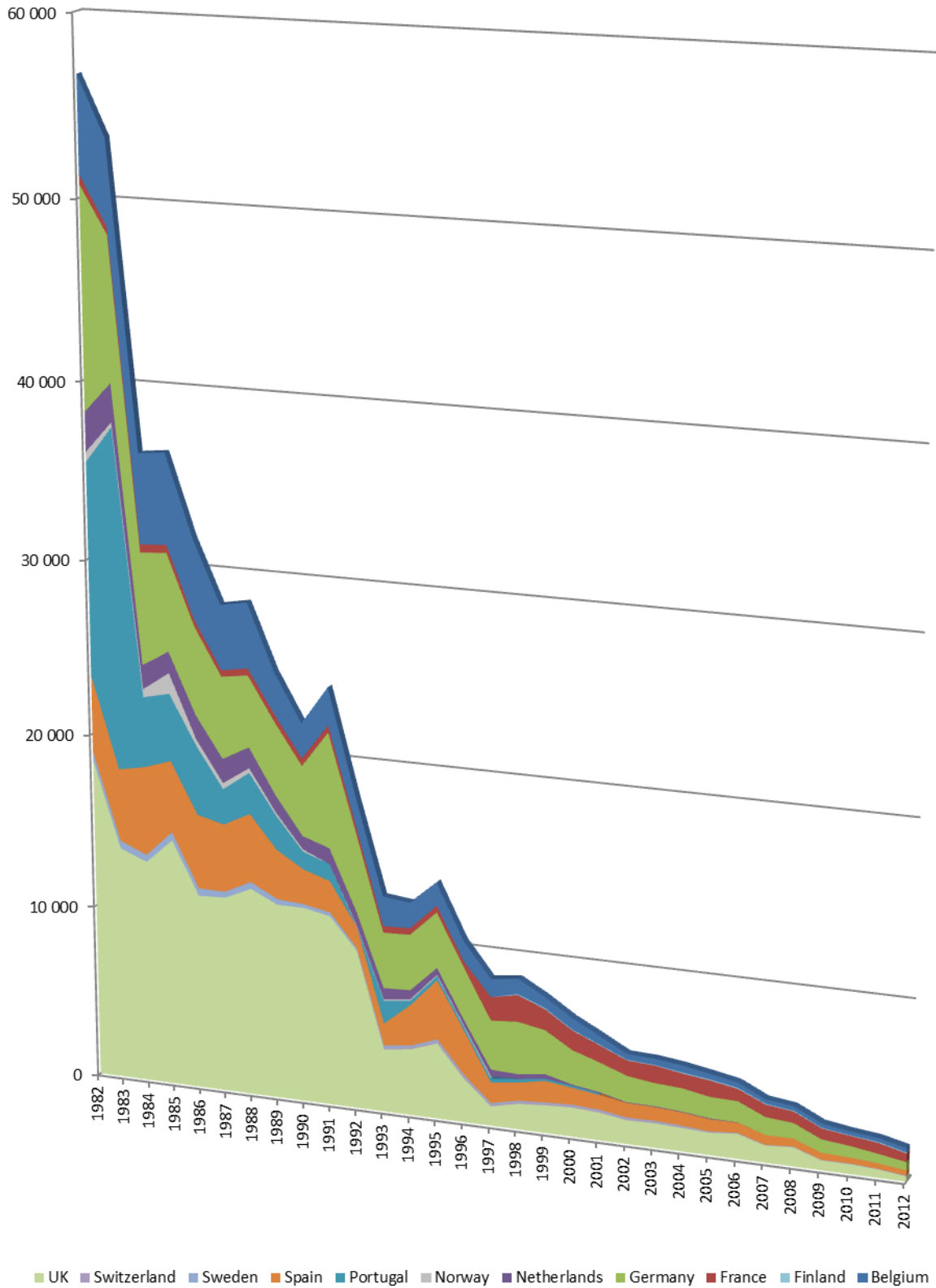
**Figure 1a:** Cumulative area chart showing chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area by Contracting Party (in kilotonnes per year)



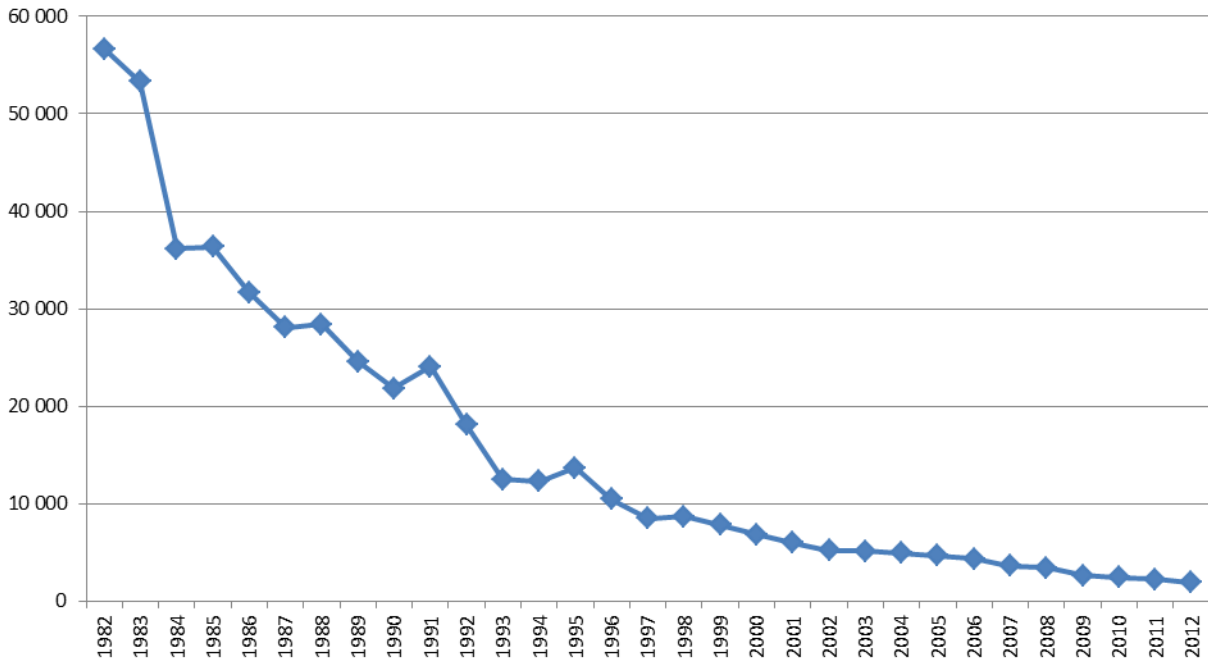


**Figure 1b:** Total chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area for all Contracting Parties (in kilotonnes per year)

Mercury losses from the chlor-alkali industry in 2012



**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)



**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)

Mercury losses from the chlor-alkali industry in 2012

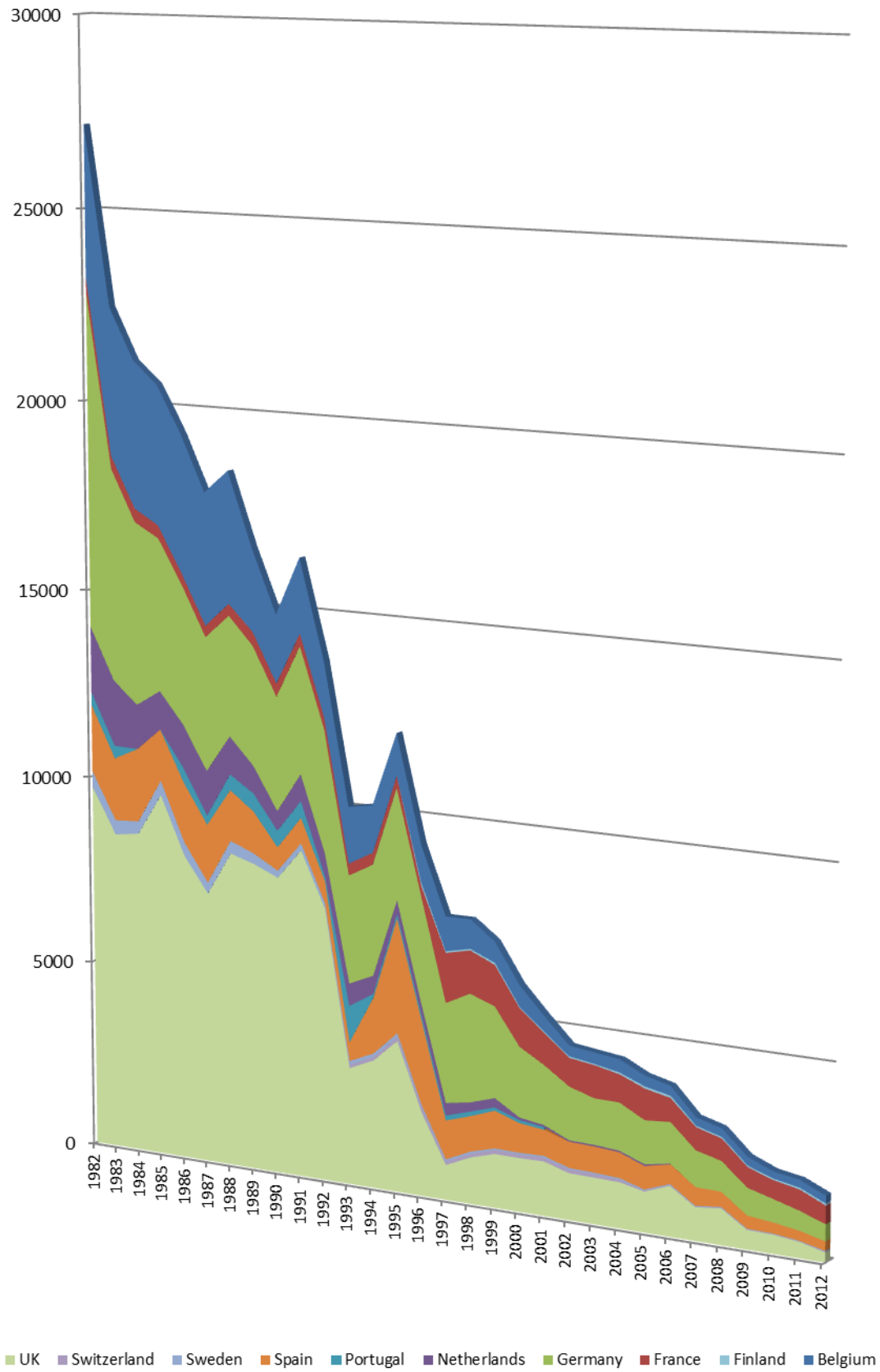
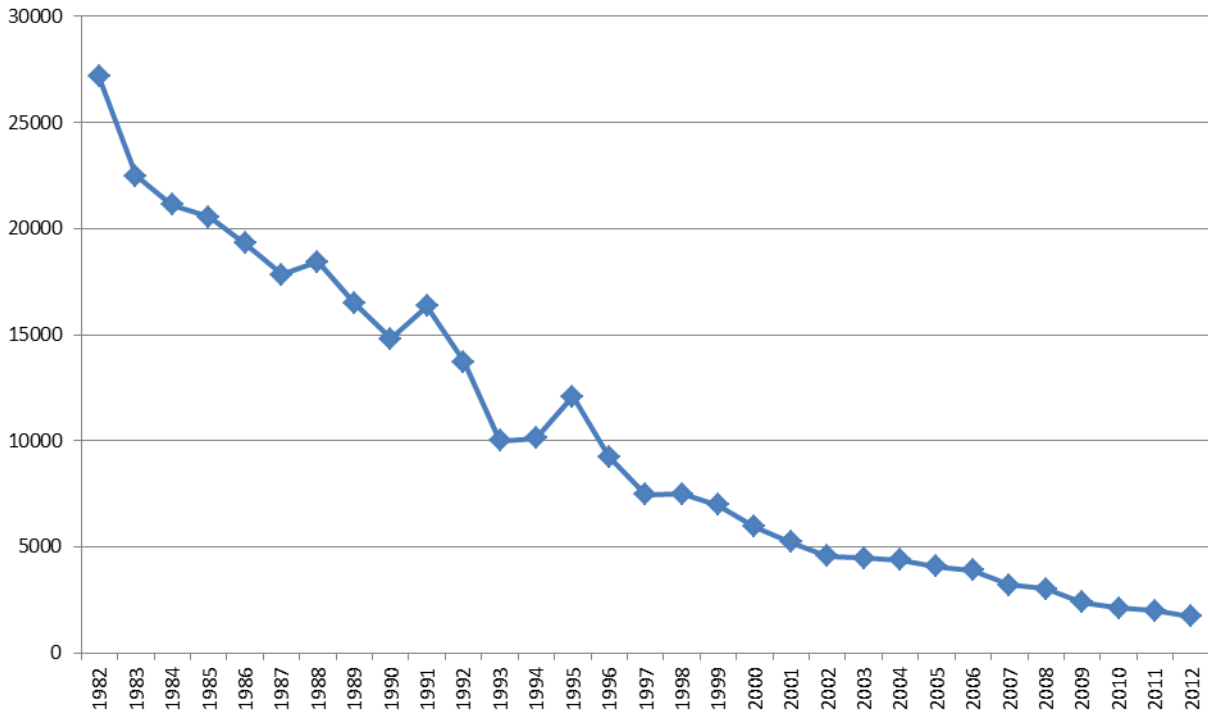


Figure 3a: Cumulative area chart showing atmospheric emissions of mercury from all plants from Contracting Parties (in kilograms per year, all plants)



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

Mercury losses from the chlor-alkali industry in 2012

**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
<b>Belgium</b>															
BE/1 <sup>2*</sup>	219 000	230 000	219 000	219 000	219 000	219 000	219 000	219 000	219 000	219 000	219 000	180 000	180 000	180 000	167 006
BE/2 <sup>*</sup>	250 000	250 000	250 000	250 000	250 000	250 000	250 000	250 000	227 500	205 000	205 000	205 000	205 000	205 000	205 000
BE/3 <sup>*</sup>	120 000	100 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	110 000	110 000	110 000	110 000
BE/4 <sup>*</sup>	90 900	82 000	90 900	41 663	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Total</b>	<b>679 900</b>	<b>662 000</b>	<b>679 900</b>	<b>630 663</b>	<b>589 000</b>	<b>589 000</b>	<b>589 000</b>	<b>589 000</b>	<b>566 500</b>	<b>544 000</b>	<b>544 000</b>	<b>495 000</b>	<b>495 000</b>	<b>495 000</b>	<b>482 006</b>

<b>Finland</b>															
SFR/1	40 000	40 000	40 000	40 000	42 485	42 485	42 485	42 485	42 485	42 485	42 485	42 485	40 000	40 000	40 000
<b>Total</b>	<b>40 000</b>	<b>40 000</b>	<b>40 000</b>	<b>40 000</b>	<b>42 485</b>	<b>42 485</b>	<b>42 485</b>	<b>42 485</b>	<b>42 485</b>	<b>42 485</b>	<b>42 485</b>	<b>42 485</b>	<b>40 000</b>	<b>40 000</b>	<b>40 000</b>

<b>France</b>															
FR/1 <sup>*</sup>	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040
FR/2 <sup>*</sup>	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000
FR/3 <sup>2</sup>	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 000	240 000	222 128
FR/4 <sup>3</sup>	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	127 550
FR/5 <sup>*</sup>	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500
FR/6	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000
FR/7	184 300	184 300	184 300	184 300	184 300	184 300	184 300	184 300	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>873 810</b>	<b>873 810</b>	<b>873 810</b>	<b>873 810</b>	<b>873 810</b>	<b>873 810</b>	<b>873 810</b>	<b>873 810</b>	<b>689 509</b>	<b>689 509</b>	<b>689 509</b>	<b>689 509</b>	<b>688 609</b>	<b>688 609</b>	<b>628 218</b>

<b>Germany</b>															
DE/1	130 000	65 000	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/2 <sup>2*</sup>	130 000	130 000	140 000	140 000	110 000	110 000	110 000	130 000	130 000	130 000	130 000	130 000	130 000	130 000	29 957
DE/3 <sup>*</sup>	120 000	120 000	125 000	125 000	125 000	125 000	125 000	125 000	125 276	125 276	125 276	125 276	125 276	125 276	125 276
DE/4 <sup>*</sup>	150 000	300 000	300 000	300 000	153 000	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/5 <sup>*</sup>	180 000	150 000	160 000	160 000	160 000	160 000	160 000	165 500	170 000	170 000	170 000	170 000	170 000	170 000	170 000
DE/6 <sup>*</sup>	65 000	130 000	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828
DE/7 <sup>*</sup>	160 000	180 000	182 000	176 000	176 000	176 000	176 000	176 000	176 000	72 811	N/I	N/I	N/I	N/I	N/I
DE/8 <sup>*</sup>	200 000	98 000	135 951	135 951	135 951	135 951	135 951	135 951	135 951	135 951	135 951	137 400	137 400	137 400	137 400
DE/9 <sup>*</sup>	150 000	150 000	160 000	167 000	167 000	167 000	167 000	167 000	167 000	167 376	167 000	167 000	167 000	167 000	167 000
DE/10	300 000	248 000	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	50 000	60 000	9 804	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/12	72 000	157 000	157 000	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/13 <sup>4</sup>	157 000	150 000	160 000	160 000	160 000	160 000	160 000	160 000	160 000	160 000	160 000	39 216	MT	MT	MT
DE/14 <sup>5</sup>	300 000	72 000	82 355	82 355	82 355	82 355	82 355	82 355	82 355	82 355	82 355	41 178	MT	MT	MT
DE/15	120 000	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>2344000</b>	<b>2010000</b>	<b>1760938</b>	<b>1595134</b>	<b>1416134</b>	<b>1265134</b>	<b>1265134</b>	<b>1290634</b>	<b>1295411</b>	<b>1192597</b>	<b>1119410</b>	<b>958 898</b>	<b>878 505</b>	<b>878 505</b>	<b>778 462</b>

<b>Netherlands</b>															
NL/1 <sup>*</sup>	70 000	70 000	74 294	74 294	74 294	74 294	74 294	74 294	37 452	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
NL/2 <sup>*</sup>	140 000	140 000	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>210 000</b>	<b>210 000</b>	<b>74 294</b>	<b>74 294</b>	<b>74 294</b>	<b>74 294</b>	<b>74 294</b>	<b>74 294</b>	<b>37 452</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<sup>2</sup> The indicated production capacities of Lillo (Belgium), Tavaux (France) and Uerdingen (Germany) are lower than the previous year as these plants shut down during 2012.

<sup>3</sup> The production capacity of Jarrie (France) is reduced during 2012 due to a progressive conversion.

<sup>4</sup> The plant has converted to membrane technology; the reported "mercury" capacity is pro rata the time the plants were in production

<sup>5</sup> The plant has converted to membrane technology; the reported "mercury" capacity is pro rata the time the plants were in production

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Portugal</b>															
P/1*	48 600	48 000	43 302	43 302	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P/2*	26 400	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>75 000</b>	<b>48 000</b>	<b>43 302</b>	<b>43 302</b>											

<b>Spain</b>															
ES/1	31 920	30 000	31 373	31 373	31 373	31 373	31 373	31 373	31 373	31 373	31 373	31 373	31 373	31 373	31 373
ES/2*	14 815	15 000	14 815	14 815	9 877	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
ES/3*	33 552	33 500	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552
ES/4	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	115 200	115 200	115 200
ES/5*	62 745	63 000	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747
ES/6	209 200	209 000	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871
ES/7 <sup>6</sup>	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	10 417	MT	MT	MT
ES/8	135 000	135 000	135 004	135 004	135 004	135 004	135 004	135 004	135 004	135 004	135 004	135 004	135 000	135 000	135 000
ES/9 <sup>7</sup>	101 000	101 000	100 929	100 929	100 929	100 929	100 929	100 929	100 929	100 929	100 929	100 929	47 496	47 496	47 496
<b>Total</b>	<b>763 232</b>	<b>761 500</b>	<b>771 291</b>	<b>771 291</b>	<b>766 353</b>	<b>756 476</b>	<b>756 476</b>	<b>756 476</b>	<b>756 475</b>	<b>756 475</b>	<b>756 475</b>	<b>741 892</b>	<b>643 239</b>	<b>643 239</b>	<b>643 239</b>

<b>Sweden</b>															
SE/1*	100 000	100 000	100 000	100 000	100 000	100 000	100 000	74 355	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
SE/2*	120 000	120 000	132 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000
<b>Total</b>	<b>220 000</b>	<b>220 000</b>	<b>232 000</b>	<b>220 000</b>	<b>220 000</b>	<b>220 000</b>	<b>220 000</b>	<b>194 355</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>
<b>Switzerland</b>															
CH/1*	55 000	55 000	55 000	55 000	55 000	55 000	32 083	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/2	26 500	22 000	26 500	26 500	26 500	26 500	26 500	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/3*	27 000	26 500	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000
<b>Total</b>	<b>108 500</b>	<b>103 500</b>	<b>108 500</b>	<b>108 500</b>	<b>108 500</b>	<b>108 500</b>	<b>85 583<sup>8</sup></b>	<b>27 000</b>	<b>27 000</b>	<b>27 000</b>	<b>27 000</b>	<b>27 000</b>	<b>27 000</b>	<b>27 000</b>	<b>27 000</b>

<b>UK</b>															
UK/1*	29 000	29 000	29 413	29 413	29 413	29 413	29 413	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/2*	89 872	89 000	89 872	89 872	89 872	89 872	89 872	74 855	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/3 <sup>9</sup>	737 000	738 000	738 000	738 000	738 000	738 000	738 000	738 000	738 000	367 000	367 000	346 000	277 000	277 000	277 000
<b>Total</b>	<b>855 872</b>	<b>856 000</b>	<b>857 285</b>	<b>857 285</b>	<b>857 285</b>	<b>857 285</b>	<b>857 285</b>	<b>812 855</b>	<b>738 000</b>	<b>367 000</b>	<b>367 000</b>	<b>346 000</b>	<b>277 000</b>	<b>277 000</b>	<b>277 000</b>

### Production capacity of all installations in the Convention area

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
tonnes	6170314	5784810	5441320	5214279	4947861	4786984	4764067	4660910	4272833	3739066	3665879	3420784	3169352	3169352	2995923
%	100	93,8	88,2	84,5	80,2	77,6	77,2	75,5	62,2	60,6	59,4	55,4	51,3	51,3	48,6

### Production capacity of installations in the OSPAR catchment area

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
tonnes	3819424	3810540	3805143	3744906	3476003	3315126	3292209	3215551	3011775	2478009	2404822	2215487	2053839	2053839	1940802
%	100	99,8	99,6	98,0	91,0	86,8	86,2	84,2	78,8	64,9	63,0	58,0	53,8	53,8	50,8

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

<sup>6</sup> The plant has converted to membrane technology; the reported "mercury" capacity is pro rata the time the plants were in production

<sup>7</sup> A restructuring of the plant was carried out at the end of 2009, resulting in a reduction in the chlorine production capacity: from 100 929 t/y in 2009 to 47 496 t/y in 2010. Consequently, the number of electrolysis cells working decreased from 34 to 16.

<sup>8</sup> The Solvay chlorine production unit located in Zurzach (CH/1) was shut down at the beginning of August 2004 and, in agreement with the Euro Chlor rules, a yearly production capacity "pro rata temporis" was considered (i.e. 55 000 t/y \* 7 /12 = 32 083 t/y).

<sup>9</sup> This plant is undergoing conversion to membrane technology and if the mercury losses are calculated only on the effective mercury capacity, then the value would be 1.58g/te. In agreement with the Euro Chlor rules, a yearly production capacity "pro rata temporis" was considered before the definitive shut down.

Mercury losses from the chlor-alkali industry in 2012

**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
<b>Belgium</b>															
BE/1	304	173	157	122	82	92	142	88	98	56	60	60	60	49	94
BE/2	200	178	180	175	169	186	178	179	142	131	128	129	108	127	109
BE/3	168	113	111	88	78	85	82	60	64	67	64	59	52	53	49
BE/4	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
<b>Total</b>	<b>893</b>	<b>637</b>	<b>649</b>	<b>505</b>	<b>329</b>	<b>363</b>	<b>402</b>	<b>327</b>	<b>304</b>	<b>254</b>	<b>252</b>	<b>248</b>	<b>220</b>	<b>229</b>	<b>252</b>
<b>Finland</b>															
SFR/1	49	63	43	41	44	37	56	59	63	42	42	41	40	50	50
<b>Total</b>	<b>49</b>	<b>63</b>	<b>43</b>	<b>41</b>	<b>44</b>	<b>37</b>	<b>56</b>	<b>59</b>	<b>63</b>	<b>42</b>	<b>42</b>	<b>41</b>	<b>40</b>	<b>50</b>	<b>50</b>
<b>France</b>															
FR/1	30	28	29	24	15	12	25	21	13	26	14	21	30	25	12
FR/2	117	129	119	121	92	118	116	125	119	122	104	85	99	72	50
FR/3	569	345	338	226	216	245	189	202	224	244	271	226	202	242	238
FR/4	221	192	220	203	152	127	96	106	119	111	100	105	123	109	99
FR/5	30	32	32	33	34	33	32	29	29	24	24	23	22	22	20
FR/6	217	190	152	139	175	185	147	168	195	188	145	159	95	148	128
FR/7	356	281	243	237	202	282	242	290	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>1149</b>	<b>1197</b>	<b>1133</b>	<b>983</b>	<b>886</b>	<b>1002</b>	<b>847</b>	<b>941</b>	<b>699</b>	<b>714</b>	<b>657</b>	<b>619</b>	<b>571</b>	<b>618</b>	<b>487</b>
<b>Germany</b>															
DE/1	118	111	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/2	203	147	247	159	127	128	103	94	97	85	77	72	61	82	15
DE/3	277	49	73	75	78	80	92	86	91	104	120	53	49	51	51
DE/4	369	367	367	358	285	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/5	278	261	166	162	157	169	173	169	160	151	153	153	153	146	122
DE/6	98	70	62	52	49	77	116	64	97	74	95	111	104	67	77
DE/7	273	313	257	199	218	289	260	194	179	84	shutdown	shutdown	shutdown	shutdown	shutdown
DE/8	74	193	209	228	174	159	151	170	162	150	126	124	126	77	78
DE/9	184	161	165	197	199	213	244	243	207	170	146	192	162	124	125
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
DE/11	69	104	18	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/12	113	132	137	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/13	142	137	171	201	163	146	141	153	158	159	117	35	MT	MT	MT
DE/14	285	100	112	80	67	64	62	56	55	52	45	20	MT	MT	MT
DE/15	304	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>285</b>	<b>2536</b>	<b>1982</b>	<b>1711</b>	<b>1517</b>	<b>1325</b>	<b>1343</b>	<b>1229</b>	<b>1206</b>	<b>1029</b>	<b>878</b>	<b>759</b>	<b>655</b>	<b>547</b>	<b>469</b>
<b>Netherlands</b>															
NL/1	92	71	68	57	41	45	42	46	22	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
NL/2	190	196	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>282</b>	<b>267</b>	<b>68</b>	<b>57</b>	<b>41</b>	<b>45</b>	<b>42</b>	<b>46</b>	<b>22</b>						
<b>Portugal</b>															
P/1	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
P/2	60	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>202</b>	<b>130</b>	<b>121</b>	<b>100</b>											
<b>Spain</b>															
ES/1	122	61	63	58	48	45	46	38	35	30	24	24	22	21	24
ES/2	79	30	29	25	16	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
ES/3	34	66	57	52	38	42	32	30	27	23	21	18	17	17	16
ES/4	140	287	164	114	123	137	121	121	110	102	103	78	53	48	44
ES/5	216	142	102	101	86	74	92	47	29	34	40	42	31	36	41
ES/6	62	182	182	193	185	199	205	203	154	156	89	96	111	94	76



Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ES/7	223	53	49	32	36	30	26	25	25	24	20	8	MT	MT	MT
ES/8	45	251	244	176	174	174	154	139	137	120	97	88	80	73	74
ES/9	136	175	95	103	132	99	94	109	68	70	68	50	29	20	21
<b>Total</b>	<b>1057</b>	<b>1247</b>	<b>985</b>	<b>854</b>	<b>838</b>	<b>800</b>	<b>770</b>	<b>713</b>	<b>585</b>	<b>560</b>	<b>463</b>	<b>404</b>	<b>334</b>	<b>309</b>	<b>297</b>

Sweden															
SE/1	24	27	28	29	26	22	25	14	shutdown	shutdown	shutdown	shutdown	shutdown		
SE/2	41	18	19	18	17	19	22	20	20	20	22	17	17	16	18
<b>Total</b>	<b>65</b>	<b>45</b>	<b>47</b>	<b>47</b>	<b>43</b>	<b>41</b>	<b>47</b>	<b>34</b>	<b>20</b>	<b>20</b>	<b>22</b>	<b>17</b>	<b>17</b>	<b>16</b>	<b>18</b>

Switzerland															
CH/1	62	82	70	64	73	67	39	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/2	23	19	20	28	19	19	11	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/3	26	15	19	25	17	12	22	30	32	20	21	18	26	16	26
<b>Total</b>	<b>111</b>	<b>116</b>	<b>109</b>	<b>117</b>	<b>109</b>	<b>98</b>	<b>72</b>	<b>30</b>	<b>32</b>	<b>20</b>	<b>21</b>	<b>18</b>	<b>26</b>	<b>16</b>	<b>26</b>

UK															
UK/1	14	15	16	17	18	35	54	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/2	106	125	144	157	175	144	154	112	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/3	1373	1 476	1 535	1 439	1 188	1 237	1 155	1 183	1 444	983	1 097	567	565	485	302
<b>Total</b>	<b>1493</b>	<b>1616</b>	<b>1695</b>	<b>1613</b>	<b>1381</b>	<b>1416</b>	<b>1363</b>	<b>1295</b>	<b>1444</b>	<b>983</b>	<b>1 097</b>	<b>567</b>	<b>565</b>	<b>485</b>	<b>302</b>

**Total mercury losses through product, waste water and air from all installations in the Convention area (waste water discharges from installations in the OSPAR catchment area only)**

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>kg/year</b>	<b>8179</b>	<b>7854</b>	<b>6832</b>	<b>6028</b>	<b>5188</b>	<b>4933</b>	<b>4730</b>	<b>4450</b>	<b>4192</b>	<b>3499</b>	<b>3322</b>	<b>2562</b>	<b>2324</b>	<b>2163</b>	<b>1901</b>
<b>%</b>	<b>100</b>	<b>96,0</b>	<b>83,5</b>	<b>73,3</b>	<b>63,4</b>	<b>60,3</b>	<b>57,8</b>	<b>54,4</b>	<b>51,3</b>	<b>42,8</b>	<b>40,6</b>	<b>31</b>	<b>28,4</b>	<b>26,4</b>	<b>23,2</b>

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

Mercury losses from the chlor-alkali industry in 2012

**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
<b>Belgium</b>															
BE/1	1,39	0,750	0,715	0,556	0,374	0,419	0,649	0,400	0,446	0,258	0,28	0,33	0,34	0,27	0,56
BE/2	0,8	0,710	0,720	0,699	0,676	0,744	0,712	0,718	0,624	0,639	0,62	0,63	0,53	0,62	0,53
BE/3	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
BE/4	2,44	2,110	2,212	2,890	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Finland</b>															
SFR/1	1,23	1,574	1,078	1,026	1,046	0,878	1,324	1,380	1,478	0,994	1,00	0,95	0,99	1,24	1,28
<b>France</b>															
FR/1	1,66	1,580	1,631	1,317	0,819	0,646	1,400	1,149	0,720	1,416	0,79	1,14	1,69	1,39	0,66
FR/2	1,63	1,792	1,646	1,680	1,277	1,644	1,615	1,732	1,658	1,689	1,44	1,19	1,37	1,00	0,70
FR/3	2,36	1,431	1,403	0,940	0,896	1,019	0,785	0,838	0,932	1,011	1,13	0,94	0,84	1,01	1,07
FR/4	1,3	1,131	1,292	1,197	0,896	0,746	0,567	0,621	0,699	0,650	0,59	0,62	0,72	0,64	0,78
FR/5	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
FR/6	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
FR/7	1,93	1,522	1,320	1,286	1,094	1,530	1,312	1,574	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Germany</b>															
DE/1	1,72	1,707	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/2	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
DE/3	2,22	0,406	0,583	0,601	0,622	0,640	0,733	0,689	0,730	0,830	0,96	0,42	0,39	0,41	0,41
DE/4	1,23	1,223	1,223	1,193	1,862	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/5	1,74	1,740	1,040	1,010	0,980	1,060	1,083	1,020	0,940	0,890	0,90	0,90	0,90	0,86	0,72
DE/6	0,75	0,540	0,416	0,348	0,326	0,515	0,777	0,428	0,655	0,496	0,64	0,75	0,70	0,45	0,52
DE/7	1,5	1,740	1,410	1,130	1,240	1,640	1,479	1,101	1,018	1,156	shutdown	shutdown	shutdown	shutdown	shutdown
DE/8	0,75	1,970	1,540	1,680	1,281	1,167	1,111	1,254	1,193	1,102	0,93	0,90	0,92	0,56	0,57
DE/9	1,08	1,070	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
DE/10	0,98	1,576	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/11	2,17	1,740	1,864	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/12	0,72	0,843	0,871	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/13	0,89	0,910	1,069	1,259	1,019	0,911	0,884	0,956	0,985	0,994	0,74	0,90	MT	MT	MT
DE/14	1,48	1,390	1,364	0,966	0,815	0,776	0,757	0,680	0,669	0,630	0,55	0,49	MT	MT	MT
DE/15	1,52	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Netherlands</b>															
NL/1	0,99	1,008	0,909	0,765	0,551	0,610	0,571	0,615	0,587	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
NL/2	1,5	1,400	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Portugal</b>															
P/1	2,64	2,700	2,800	2,300	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
P/2	Nl	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Spain</b>															
ES/1	1,95	2,040	2,020	1,861	1,545	1,430	1,461	1,204	1,122	0,971	0,78	0,77	0,71	0,66	0,76
ES/2	2,25	2,020	1,948	1,667	1,626	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
ES/3	2,96	1,970	1,699	1,563	1,123	1,264	0,945	0,884	0,810	0,682	0,62	0,53	0,51	0,51	0,49
ES/4	1,81	1,910	1,094	0,762	0,821	0,911	0,811	0,806	0,730	0,683	0,69	0,52	0,46	0,42	0,38
ES/5	2,61	2,259	1,632	1,608	1,368	1,172	1,461	0,756	0,458	0,548	0,63	0,68	0,50	0,58	0,65
ES/6	0,73	0,870	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
ES/7	2,6	2,100	1,940	1,265	1,428	1,220	1,030	1,017	1,020	0,969	0,80	0,78	MT	MT	MT
ES/8	1,73	1,860	1,810	1,300	1,290	1,290	1,140	1,030	1,014	0,890	0,72	0,65	0,59	0,54	0,55
ES/9	1,42	1,730	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

Sweden															
SE/1	0,44	0,268	0,278	0,288	0,258	0,221	0,248	0,186	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
SE/2	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

Switzerland															
CH/1	1,12	1,490	1,271	1,162	1,336	1,227	1,227	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/2	NI	0,877	0,743	1,054	0,699	0,712	0,429	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/3	0,98	0,560	0,692	0,917	0,638	0,434	0,802	1,110	1,170	0,727	0,76	0,67	0,98	0,60	0,97

UK															
UK/1	0,64	0,525	0,538	0,574	0,606	1,180	1,852	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/2	1,29	1,410	1,600	1,744	1,950	1,600	1,710	1,494	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/3 <sup>10</sup>	1,84	2,000	2,080	1,950	1,610	1,677	1,565	1,603	1,957	2,679	2,99	1,64	2,04	1,75	1,09

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

<sup>10</sup> This plant is undergoing conversion to membrane technology and if the mercury losses are calculated only on the effective mercury capacity, then the value would be 1,58g/te.

Mercury losses from the chlor-alkali industry in 2012

**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
<b>Belgium</b>															
BE/1	290	156	137	106	68	74	120	67	79	43	50	54	42	37	55
BE/2	176	154	157	153	153	164	160	164	129	122	121	121	102	119	103
BE/3	146	101	98	74	63	62	64	49	49	52	50	47	42	44	45
BE/4	160	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
<b>Total</b>	<b>772</b>	<b>558</b>	<b>564</b>	<b>413</b>	<b>284</b>	<b>300</b>	<b>344</b>	<b>280</b>	<b>257</b>	<b>217</b>	<b>222</b>	<b>221</b>	<b>186</b>	<b>200</b>	<b>203</b>

<b>Finland</b>															
SFR/1	40	53	35	34	39	31	46	54	57	37	39	38	37	46	50
<b>Total</b>	<b>40</b>	<b>53</b>	<b>35</b>	<b>34</b>	<b>39</b>	<b>31</b>	<b>46</b>	<b>54</b>	<b>57</b>	<b>37</b>	<b>39</b>	<b>38</b>	<b>37</b>	<b>46</b>	<b>50</b>

<b>France</b>															
FR/1	26	25	26	21	12	7	14	11	11	12	12	19	24	20	9
FR/2	111	115	103	108	80	103	106	113	109	96	96	76	94	66	45
FR/3	301	320	313	210	202	235	181	191	212	226	259	219	192	238	233
FR/4	179	182	188	171	109	88	67	64	89	84	74	72	87	75	64
FR/5	330	25	25	26	27	27	26	24	24	19	19	18	18	17	17
FR/6	24	161	129	109	147	142	118	139	172	159	117	129	68	120	108
FR/7	160	255	223	186	170	255	217	275	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>1131</b>	<b>1083</b>	<b>1007</b>	<b>831</b>	<b>747</b>	<b>857</b>	<b>729</b>	<b>818</b>	<b>617</b>	<b>596</b>	<b>577</b>	<b>532</b>	<b>482</b>	<b>534</b>	<b>475</b>

<b>Germany</b>															
DE/1	173	105	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/2	92	135	235	146	114	113	98	88	88	78	73	68	56	78	14
DE/3	84	39	63	68	71	74	86	80	84	82	88	46	43	46	48
DE/4	255	353	353	345	274	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/5	256	255	160	155	150	163	167	162	153	144	146	146	146	139	116
DE/6	105	66	58	48	45	72	111	59	48	70	90	106	100	63	73
DE/7	128	301	244	187	206	276	247	181	166	80	shutdown	shutdown	shutdown	shutdown	shutdown
DE/8	280	175	171	179	141	113	114	142	141	139	111	111	110	69	69
DE/9	150	149	151	185	188	203	233	232	195	158	136	182	145	117	115
DE/10	354	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
DE/11	105	100	18	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/12	103	119	128	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/13	97	124	158	177	144	135	131	142	148	148	104	34	MT	MT	MT
DE/14	285	96	110	74	65	62	60	54	53	51	42	20	MT	MT	MT
DE/15	238	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>2705</b>	<b>2399</b>	<b>1849</b>	<b>1564</b>	<b>1398</b>	<b>1211</b>	<b>1248</b>	<b>1140</b>	<b>1079</b>	<b>950</b>	<b>790</b>	<b>712</b>	<b>600</b>	<b>512</b>	<b>434</b>

<b>Netherlands</b>															
NL/1	65	65	65	53	37	42	40	42	20	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
NL/2	180	178	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>245</b>	<b>243</b>	<b>65</b>	<b>53</b>	<b>37</b>	<b>42</b>	<b>40</b>	<b>42</b>	<b>20</b>	<b>shutdown</b>	<b>shutdown</b>	<b>shutdown</b>	<b>shutdown</b>	<b>shutdown</b>	<b>shutdown</b>

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

Portugal															
P/1	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
P/2	28	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>120</b>	<b>91</b>	<b>82</b>	<b>69</b>											

Spain															
ES/1	31	38	45	36	33	38	40	32	30	26	19	21	20	19	20
ES/2	21	20	19	17	12	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
ES/3	66	51	43	32	23	31	23	21	21	17	16	15	14	14	13
ES/4	210	218	118	69	80	114	105	101	92	92	89	66	42	40	37
ES/5	109	91	85	91	77	63	74	38	20	20	26	27	18	22	30
ES/6	126	157	165	178	171	182	193	188	146	144	83	90	99	85	65
ES/7	48	35	27	22	28	26	22	22	22	21	18	7	MT	MT	MT
ES/8	203	227	204	155	148	151	128	117	117	101	82	69	63	57	59
ES/9	123	152	74	84	112	81	85	93	59	62	61	46	27	19	19
<b>Total</b>	<b>937</b>	<b>989</b>	<b>780</b>	<b>684</b>	<b>684</b>	<b>686</b>	<b>670</b>	<b>613</b>	<b>509</b>	<b>483</b>	<b>394</b>	<b>341</b>	<b>284</b>	<b>255</b>	<b>245</b>

Sweden															
SE/1	37	25	25	27	23	20	23	13	shutdown	shutdown	shutdown	shutdown	Shutdown	Shutdown	Shutdown
SE/2	21	17	17	17	15	16	20	18	19	18	20	16	16	14	17
<b>Total</b>	<b>58</b>	<b>42</b>	<b>42</b>	<b>44</b>	<b>38</b>	<b>36</b>	<b>43</b>	<b>31</b>	<b>19</b>	<b>18</b>	<b>20</b>	<b>16</b>	<b>16</b>	<b>14</b>	<b>17</b>

Switzerland															
CH/1	57	75	63	58	69	65	38	shutdown	shutdown	shutdown	shutdown	shutdown	Shutdown	Shutdown	Shutdown
CH/2	18	19	19	27	18	18	11	shutdown	shutdown	shutdown	shutdown	shutdown	Shutdown	Shutdown	Shutdown
CH/3	21	10	14	17	14	8	17	22	27	15	17	11	14	13	21
<b>Total</b>	<b>96</b>	<b>104</b>	<b>96</b>	<b>102</b>	<b>101</b>	<b>91</b>	<b>66</b>	<b>22</b>	<b>27</b>	<b>15</b>	<b>17</b>	<b>11</b>	<b>14</b>	<b>13</b>	<b>21</b>

UK															
UK/1	14	14	14	13	13	29	49	shutdown	shutdown	shutdown	shutdown	shutdown	Shutdown	Shutdown	Shutdown
UK/2	106	117	137	149	169	137	147	108	shutdown	shutdown	shutdown	shutdown	Shutdown	Shutdown	Shutdown
UK/3	1107	1292	1269	1270	1048	1053	1010	958	1322	876	951	509	493	421	260
<b>Total</b>	<b>1227</b>	<b>1423</b>	<b>1420</b>	<b>1432</b>	<b>1230</b>	<b>1219</b>	<b>1206</b>	<b>1066</b>	<b>1322</b>	<b>876</b>	<b>951</b>	<b>509</b>	<b>493</b>	<b>421</b>	<b>260</b>

### Total atmospheric emissions of mercury from all installations in the OSPAR Convention area<sup>1</sup>

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>kg/year</b>	7331	6985	5940	5226	4558	4475	4392	4066	3906	3197	3009	2380	2112	1996	1705
<b>%</b>	100	95,3	81,0	71,3	62,2	61	59,9	55,5	53,3	43,6	41,0	36,0	28,8	27,2	23,3

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

Mercury losses from the chlor-alkali industry in 2012

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

Site	1998	1999	2000	2001	2002	2003	2004	2005	2010	2007	2008	2009	2010	2011	2012
<b>Belgium</b>															
BE/1	1,320	0,680	0,627	0,484	0,310	0,338	0,547	0,307	0,360	0,196	0,23	0,30	0,23	0,21	0,33
BE/2	0,705	0,617	0,627	0,615	0,611	0,657	0,641	0,654	0,565	0,598	0,59	0,59	0,50	0,58	0,50
BE/3	1,213	1,013	0,813	0,615	0,524	0,516	0,531	0,411	0,412	0,432	0,42	0,43	0,39	0,40	0,41
BE/4	1,770	1,780	1,888	1,930	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Finland</b>															
SFR/1	1,000	1,322	0,885	0,856	0,916	0,738	1,084	1,27	1,335	0,870	0,92	0,90	0,93	1,16	1,24
<b>France</b>															
FR/1	1,390	1,380	1,442	1,154	0,651	0,416	0,763	0,618	0,600	0,648	0,656	1,03	1,32	1,11	0,48
FR/2	1,540	1,600	1,424	1,498	1,111	1,433	1,469	1,570	1,510	1,333	1,336	1,05	1,30	0,91	0,62
FR/3	1,250	1,330	1,300	0,871	0,838	0,976	0,752	0,792	0,880	0,938	1,076	0,91	0,80	0,99	1,05
FR/4	1,050	1,068	1,108	1,004	0,641	0,518	0,396	0,375	0,525	0,493	0,436	0,42	0,51	0,44	0,50
FR/5	1,790	1,123	1,132	1,159	1,199	1,186	1,153	1,087	1,075	0,849	0,829	0,81	0,78	0,75	0,74
FR/6	1,080	0,971	0,776	0,660	0,886	0,853	0,712	0,840	1,035	0,958	0,702	0,78	0,41	0,72	0,65
FR/7	0,960	1,381	1,210	1,011	0,921	1,384	1,176	1,494	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Germany</b>															
DE/1	1,330	1,610	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/2	0,710	1,040	1,680	1,040	1,040	1,030	0,890	0,680	0,680	0,600	0,56	0,52	0,43	0,60	0,47
DE/3	0,700	0,322	0,507	0,546	0,571	0,592	0,687	0,639	0,673	0,653	0,70	0,37	0,34	0,37	0,38
DE/4	1,700	1,175	1,175	1,150	1,792	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/5	1,420	1,700	1,000	0,970	0,940	1,020	1,043	0,980	0,900	0,850	0,86	0,86	0,86	0,82	0,68
DE/6	1,609	0,510	0,390	0,322	0,303	0,481	0,745	0,396	0,324	0,471	0,608	0,71	0,67	0,42	0,49
DE/7	0,800	1,670	1,340	1,060	1,170	1,570	1,405	1,030	0,952	1,093	shutdown	shutdown	shutdown	shutdown	shutdown
DE/8	1,400	1,790	1,260	1,320	1,039	0,834	0,842	1,042	1,038	1,020	0,815	0,81	0,80	0,50	0,50
DE/9	1,000	0,995	0,942	1,106	1,125	1,215	1,396	1,387	1,170	0,946	0,812	1,09	0,87	0,70	0,69
DE/10	1,180	1,540	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	2,100	1,660	1,846	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/12	1,431	0,760	0,815	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/13	0,620	0,829	0,989	1,108	0,898	0,841	0,820	0,890	0,924	0,924	0,648	0,87	MT	MT	MT
DE/14	0,950	1,330	1,330	0,900	0,787	0,756	0,734	0,653	0,645	0,616	0,515	0,48	MT	MT	MT
DE/15	1,980	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Netherlands</b>															
NL/1	0,920	0,927	0,873	0,716	0,501	0,560	0,542	0,559	0,546	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
NL/2	1,230	1,270	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Portugal</b>															
P/1	1,893	1,900	1,900	1,600	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P/2	1,061	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Spain</b>															
ES/1	0,960	1,260	1,420	1,141	1,041	1,220	1,265	1,030	0,970	0,818	0,618	0,68	0,65	0,59	0,65
ES/2	1,430	1,330	1,272	1,153	1,166	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
ES/3	1,960	1,510	1,280	0,959	0,685	0,927	0,690	0,627	0,641	0,496	0,487	0,45	0,43	0,41	0,40

Site	1998	1999	2000	2001	2002	2003	2004	2005	2010	2007	2008	2009	2010	2011	2012
ES/4	1,400	1,450	0,784	0,462	0,537	0,760	0,699	0,674	0,616	0,614	0,594	0,44	0,37	0,35	0,32
ES/5	1,735	1,442	1,347	1,455	1,226	1,001	1,178	0,603	0,328	0,314	0,409	0,43	0,29	0,35	0,48
ES/6	0,603	0,750	0,758	0,818	0,784	0,836	0,885	0,863	0,670	0,661	0,381	0,41	0,46	0,39	0,30
ES/7	1,900	1,400	1,060	0,880	1,120	1,040	0,880	0,890	0,880	0,860	0,71	0,70	MT	MT	MT
ES/8	1,500	1,680	1,510	1,140	1,100	1,120	0,950	0,870	0,864	0,750	0,604	0,51	0,46	0,42	0,44
ES/9	1,220	1,500	0,735	0,831	1,110	0,800	0,843	0,925	0,589	0,616	0,609	0,45	0,57	0,39	0,41

Sweden																
SE/1	0,370	0,250	0,250	0,270	0,234	0,204	0,231	0,173	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
SE/2	0,171	0,139	0,131	0,140	0,121	0,135	0,167	0,151	0,155	0,147	0,166	0,13	0,13	0,13	0,14	

Switzerland																
CH/1	1,030	1,370	1,146	1,065	1,258	1,176	1,176	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/2	0,680	0,848	0,710	1,019	0,670	0,689	0,408	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/3	0,780	0,370	0,517	0,625	0,515	0,315	0,647	0,820	0,985	0,548	0,619	0,40	0,51	0,49	0,78	

UK																
UK/1	0,483	0,470	0,461	0,452	0,438	1,004	1,669	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/2	1,179	1,310	1,520	1,660	1,880	1,520	1,640	1,446	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/3	1,501	1,750	1,720	1,720	1,420	1,427	1,368	1,298	1,791	2,387	2,59	1,47	1,78	1,52	0,94	

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

Mercury losses from the chlor-alkali industry in 2012

**Table 6: Mercury in Safely Deposited Wastes\* (kg per year)<sup>11</sup>**

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Belgium</b>															
BE/1	3784	837	6823	260	2889	2293	4608	5405	304	1928	367	0	1076	1311	2073
BE/2	4513	5733	3566	4646	358	NI	250	5 949	1 139	3802	2702	6723	2003	1615	2329
BE/3	1	3	5	6	67	6	5	3	6	3	0	3	4	109	3
BE/4	105	0	2	1 242	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Total</b>	<b>8403</b>	<b>6573</b>	<b>10 396</b>	<b>6154</b>	<b>3254</b>	<b>2299</b>	<b>4863</b>	<b>11357</b>	<b>1449</b>	<b>5733</b>	<b>3070</b>	<b>6726</b>	<b>3083</b>	<b>3036</b>	<b>4405</b>

<b>Finland</b>															
SFR/1	0	0	0,16	0	0	0	0	0	0,2	0,3	0,21	0	0	0	1814
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0,16</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0,2</b>	<b>0,3</b>	<b>0,21</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1814</b>

<b>France</b>															
FR/1	42	0	0	0	18	33	75	17	0	0	0	0	0	0	0
FR/2	47	68	2632	9644	8896	6230	7268	7309	10 428	4858	7156	3876	7041	7291	7203
FR/3	1298	1257	1296	1078	922	1323	1143	1423	2106	1066	1268	1090	1062	1229	1770
FR/4	207	54	37	43	41	34	26	34	0	20	34	0	0	0	556
FR/5	250	0	70	6	238	13	3	NI	2,5	3	3	3	0	80	90
FR/6	25	33	16	64	48	25	15	9	18	18	0	6	9	10	5
FR/7	33	24	35	8	25	24	44	32	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>1902</b>	<b>1436</b>	<b>4086</b>	<b>10 843</b>	<b>10 188</b>	<b>7682</b>	<b>8574</b>	<b>8824</b>	<b>12 555</b>	<b>5965</b>	<b>8461</b>	<b>4975</b>	<b>8112</b>	<b>8609</b>	<b>9624</b>

<b>Germany</b>															
DE/1	47	31	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/2	28	4	0	NI	NI	NI	138	182	120	85	65	13	91	65	15
DE/3	2519	2	3	2	1	NI	NI	NI	3	207	223	4	3	3	4
DE/4	1806	3054	3054	1259	3437	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/5	411	66	576	766	5799	10 555	10 027	4958	1762	2514	855	0	454	0	415
DE/6	2180	1314	3764	1034	472	1591	1551	496	1386	5602	1726	2987	1607	4376	2470
DE/7	12 594	37 260	20 602	13 200	13 390	12 260	16 490	15 330	59 991	55 830	shutdown	shutdown	shutdown	shutdown	shutdown
DE/8	1	1646	2311	NI	674	2282	1536	356	358	553	431	804	961	916	717
DE/9	1480	2270	4570	4230	6366	5340	4355	3239	3241	0	2324	4401	4538	2492	0
DE/10	136	304	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	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/12	229	176	176	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/13	3547	2692	5659	9209	4378	2745	2500	2780	2309	1888	120109	5058	MT	MT	MT
DE/14	1064	1656	754	833	406	85	212	71	96	72	6289	2862	MT	MT	MT
DE/15	1720	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	<b>27 958</b>	<b>50 494</b>	<b>41 469</b>	<b>30 533</b>	<b>34 923</b>	<b>34 858</b>	<b>36 808</b>	<b>27 412</b>	<b>63 266</b>	<b>66 751</b>	<b>132 023</b>	<b>16 129</b>	<b>7655</b>	<b>7851</b>	<b>3621</b>

<b>Netherlands</b>															
NL/1	38	6	2	28	7	3	2	1	0	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
NL/2	0	0	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown

\* 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.

<sup>11</sup> In 2012, data for 1998 for individual installations were obtained from EuroChlor. As a result there were changes for some of the total.



OSPAR Commission, 2014

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

<b>Total</b>	38	6	2	28	7	3	2	1	0						
<b>Portugal</b>															
P/1	615	0	0	0	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
P/2	NI	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Total</b>	615	0	0	0	0	0	0								

<b>Spain</b>															
ES/1	84	1265	4276	495	2027	846	408	1297	807	1107	627	1807	904	1102	590
ES/2	48	27	8	9	141	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
ES/3	411	384	599	359	472	679	402	323	370	376	373	471	885	696	706
ES/4	2208	2694	6279	4868	2343	2020	2837	3549	3938	2899	3147	3802	1898	1894	2315
ES/5	1	1013	412	59	0	440	1544	1880	208	161	44	514	232	195	294
ES/6	496	604	770	1088	2339	2625	622	900	1043	3776	906	940	1109	2497	758
ES/7	20	20	10	3	13	14	NI	315	9	11	0	219	MT	MT	MT
ES/8	379	498	432	459	552	328	506	633	551	1035	652	490	424	343	1188
ES/9	197	500	401	279	169	349	185	217	156	1105	1220	500	2350	664	684
<b>Total</b>	3844	7005	13 187	7619	8056	7301	6503	9114	7082	10 470	6970	8742	7801	7391	6536

<b>Sweden</b>															
SE/1	0	6	6	850	5	NI	55	NI	NI	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
SE/2	2	1	1	1	NI	NI	NI	NI	NI	0	0	0	4238	4682	0
<b>Total</b>	2	7	7	851	5	NI	55	NI	0	0	0	0	4238	4682	0

<b>Switzerland</b>															
CH/1	327	165	178	215	207	239	139	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/2	NI	0	3	32	1	2	1	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/3	1073	1084	0	1933	NI	1891	NI	1859	0	1948	1787	1074	1865	0	1953
<b>Total</b>	1 905	1249	181	2180	208	2132	140	1859	0	1948	1787	1074	1865	0	1953

<b>UK</b>															
UK/1	140	161	268	263	136	118	246	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/2	17	37	48	147	113	119	134	43	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/3	3032	3911	3092	2842	10 745	21 247	6208	6446	15 905	11 703	1659	2315	2485	5313	1596
<b>Total</b>	3189	4109	3408	3252	10 994	21 484	6588	6489	15 905	11 703	1659	2315	2485	5313	1596

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

Mercury losses from the chlor-alkali industry in 2012

**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
<b>Belgium</b>															
BE/1	17,28	3,640	31,155	1,188	13,192	10,472	21,041	24,680	1,389	8,803	1,68	0,00	5,98	7,29	12,41
BE/2	18,05	22,930	14,264	18,585	1,432	NI	1,000	23,794	5,007	18,548	13,18	32,80	9,77	7,88	11,36
BE/3	0,01	0,025	0,039	0,046	0,055	0,047	0,038	0,029	0,050	0,023	0	0,03	0,04	0,99	0,03
BE/4	1,16	0	0,0260	29,819	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Finland</b>															
SFR/1	0,01	0,003	0,004	0,006	0,003	NI	NI	NI	NI	0,006	0,005	0	0	0	45,34
<b>France</b>															
FR/1	2,34	0	0	0	1,024	1,810	4,130	0,953	0,000	0,000	0	0,00	0,00	0,00	0,00
FR/2	0,65	0,950	36,560	133,941	123,555	86,528	100,950	101,514	144,833	67,472	99,387	53,83	97,79	101,26	100,04
FR/3	5,39	5,220	5,380	4,474	3,828	5,491	4,746	5,907	8,744	4,424	5,263	4,53	4,42	5,12	7,97
FR/4	1,22	0,320	0,215	0,255	0,240	0,200	0,155	0,202	0,000	0,115	0,197	0,00	0,00	0,00	4,36
FR/5	11,1	0	3,100	0,280	10,580	0,600	0,140	NI	0,110	0,159	0,151	0,14	0,00	3,55	4,00
FR/6	0,15	0,196	0,094	0,386	0,292	0,148	0,092	0,052	0,110	0,112	0	0,04	0,06	0,06	0,03
FR/7	0,18	0,131	0,190	0,044	0,134	0,131	0,237	0,172	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Germany</b>															
DE/1	0,68	0,480	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/2	0,2	0,030	0	0	NI	NI	1,250	1,400	0,920	0,650	0,50	0,10	0,70	0,50	0,50
DE/3	20,15	0,014	0,021	0,014	0,007	NI	NI	NI	0,023	1,653	1,782	0,03	0,03	0,02	0,03
DE/4	6,02	10,180	10,180	4,197	22,464	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/5	2,57	0,440	3,600	4,788	36,242	66	62,670	29,960	10,365	14,790	5,029	0,00	2,67	0,00	2,44
DE/6	16,77	10,104	25,290	6,950	3,171	11	10,422	3,330	9,315	37,643	11,60	20,07	10,80	29,40	16,60
DE/7	69,2	207,000	113,200	75,000	76,080	70	93,693	87,102	306,767	766,780	shutdown	shutdown	shutdown	shutdown	shutdown
DE/8	0,01	16,800	17,000	0	4,959	17	11,295	2,621	2,632	4,064	3,17	5,85	6,99	6,67	5,22
DE/9	8,71	15,134	28,560	25,329	38,119	32	26,077	19,398	19,408	0,000	13,917	26,35	27,18	14,92	0,00
DE/10	0,55	1,225	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	0,310	0	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/12	1,46	1,120	1,120	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
DE/13	22,17	17,949	35,371	57,555	27,362	17	15,628	17,378	14,434	11,800	750,682	128,99	MT	MT	MT
DE/14	12,92	23,000	9,150	10,110	4,937	1	2,571	0,857	1,160	0,877	76,366	69,50	MT	MT	MT
DE/15	8,6	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Netherlands</b>															
NL/1	0,51	0,082	0,027	0,382	0,100	0,043	0,029	0,008	0	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
NL/2	0	0	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
<b>Portugal</b>															
P/1	14,2	0	0	0	N/A	N/A	N/A	N/A	N/A	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
P/2	NI	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown

\* 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.

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

Spain															
ES/1	2,64	42,150	136,300	15,759	64,604	27	12,995	41,354	25,733	35,286	19,986	57,60	28,80	35,12	18,82
ES/2	3,23	1,800	0,556	0,607	14,300	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
ES/3	12,26	11,460	17,850	10,703	14,056	20	11,977	9,624	11,034	11,212	11,121	14,04	26,38	20,75	21,04
ES/4	14,71	17,960	41,860	32,450	15,620	13	18,910	23,662	26,255	19,325	20,98	25,34	16,48	16,44	20,10
ES/5	0,01	16,085	6,564	0,943	0,005	7	24,606	29,962	3,315	2,566	0,70	8,19	3,70	3,10	4,69
ES/6	2,37	2,890	3,533	4,994	10,737	12	2,857	4,129	4,785	17,331	4,16	4,32	5,09	11,46	3,48
ES/7	0,8	0,800	0,380	0,120	0,528	1	NI	12,600	0,362	0,443	0,00	20,99	MT	MT	MT
ES/8	2,81	3,690	3,200	3,400	4,090	2	3,750	4,690	4,080	7,670	4,832	3,63	3,14	2,54	8,80
ES/9	1,95	4,950	3,970	2,767	1,673	3	1,830	2,150	1,546	10,946	12,087	4,95	49,47	13,99	14,40

Sweden															
SE/1	0	0,064	0,064	8,500	0,052	NI	0,553	NI	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
SE/2	0,02	0,011	0,010	0,010	NI	NI	NI	NI	0	0	0	8,95	35,32	39,02	0,00

Switzerland															
CH/1	5,95	3,000	3,230	3,900	3,774	4,350	4,350	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/2	NI	0	0,104	1,216	0,021	0,061	0,030	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
CH/3	40,49	40,910	0	71,602	NI	70,048	NI	68,835	0	72,163	66,2	0	69,09	0,00	72,35

UK															
UK/1	4,75	5,540	9,115	8,938	4,631	4,001	8,359	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/2	0,19	0,420	0,530	1,640	1,260	1,330	1,490	0,573	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown	shutdown
UK/3	4,11	5,300	4,190	3,850	14,560	28,790	8,412	8,734	21,552	31,887	4,52	6,69	8,97	19,18	5,76

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

## 4. 2012 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) two overview maps showing the locations, the names and the operators 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 locations of the mercury-based chlor-alkali plants and their operators:

Country/Code	Company	Location	Status
<b>Belgium</b>			
BE/1	Solvim	Lillo	Shut down in 2012
BE/2	Tessengerlo	Tessengerlo	Only the period of time in production before the definitive shut down considered
BE/3	Solvim	Antwerpen	
BE/4	Solvay	Jemeppe	Replaced its mercury technology in 2001
<b>Finland</b>			
SFR/1	Eka Chemicals	Oulu	The permitted discharges and emissions have been increased on the basis of a revised authorisation in 2002
<b>France</b>			
FR/1	PC de Loos	Loos	
FR/2	Albemarle PPC	Thann	
FR/3	Solvay	Tavaux	Shut down in 2012
FR/4	Arkema	Jarrie	Progressive conversion
FR/5	SPC Harbonnières	Harbonnières	
FR/6	Arkema	Lavera	
FR/7	Arkema	St Auban	Closed down
<b>Germany</b>			
DE/1	ECI	Bitterfeld	Ceased operation in 1999
DE/2	Bayer	Uerdingen	Shut down in 2012
DE/3	Akzo Nobel	Ibbenbüren	
DE/4	Bayer	Leverkusen	Shut down in 2002
DE/5	BASF	Ludwigshafen	
DE/6	Ineos	Wilhelmshafen	
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.
DE/8	Evonik	Lülsdorf	
DE/9	Akzo Nobel	Frankfurt	The permitted discharges and emissions have been increased on the basis of a revised authorisation in 2001
DE/10	Bayer	Dormagen	Ceased operation in 1999
DE/11	Clariant	Gersthofen	Shut down in 2000
DE/12	Wacker Chemie	Burghausen	Shut down 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	Shut down in 1998

Mercury losses from the chlor-alkali industry in 2012

Country/Code	Company	Location	Status
<b>The Netherlands</b>			
NL/1	Akzo Nobel	Hengelo	Shut down in 2007
NL/2	Solvay	Linne-Herten	Decommissioned in 1999
<b>Portugal</b>			
P/1	Uniteca	Estarreja	Has been replaced by membrane cells in January 2002
P/2	Solvay Portugal	Póvoa de Santa Iria	Shut down in 1998
<b>Spain</b>			
ES/1	Quimica del Cinca	Monzon	
ES/2	Electroquimica de Hernani	Hernani	Partly converted to membrane technology
ES/3	Elnosa	Lourizan	
ES/4	Ercros	Flix	
ES/5	Solvay	Torrelavega	
ES/6	Solvin	Martorell	
ES/7	Ercros	Sabinanigo	Converted to membrane technology in 2009
ES/8	Ercros	Vilaseca	
ES/9	Ercros	Huelva/Palos	
<b>Sweden</b>			
SE/1	Akzo Nobel	Bohus	This plant was shut down
SE/2	Ineos	Stenungsund	Verified value
<b>Switzerland</b>			
CH/1	Solvay	Zurzach	This plant was shut down in 2004
CH/2	Syngenia	Monthey	This plant was shut down in 2005
CH/3	SF-Chem	Pratteln	
<b>United Kingdom</b>			
UK/1	Rhodia	Staveley	This plant was shut down in 2005
UK/2	Albion Chemicals	Sandbach	This plant was shut down
UK/3	Ineos	Runcorn	This plant is undergoing conversion to membrane technology. Only the period of time in production before the definitive shut down considered

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.

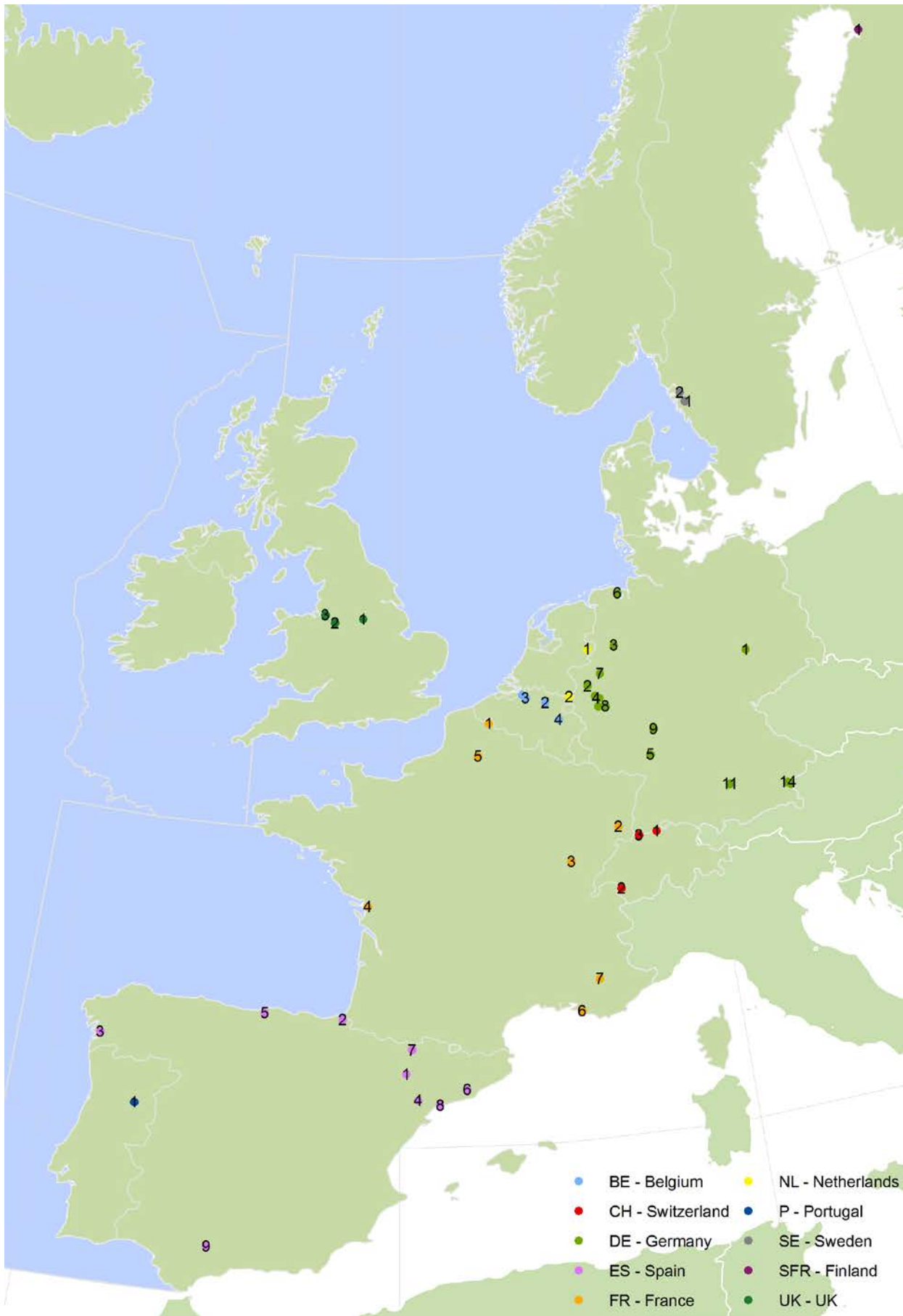


Figure 4: Map showing the location of the mercury-based chlor-alkali plants in the OSPAR Maritime Area

**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 l (tonnes)	Temporarily stored F (g/t)	
BE/1	167 006	A	R	63,83	0,20	0,02	0,025	0,31	0,33	0,56	12,41	-2,88	0,00	0,00	-17,26	68,12
BE/2	205 000	A	R	11,22	0,02	0,01	0,002	0,50	0,50	0,53	11,36	-0,76	0,63	0,00	-0,67	0,00
BE/3	110 000	A	R	25,92	0,02	0,02	0,040	0,37	0,41	0,45	0,03	1,12	0,00	0,00	10,20	15,24
<b>Total</b>	<b>482 006</b>															



**Finland**

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)	
SFR/1	40 000	Baltic	R	50,00	0,03	0,02	0,005	1,23	1,24	1,28	45,34	0,00	0,03	-0,06	-0,79	4,17
<b>Total</b>	<b>40 000</b>															

The permitted discharges and emissions have been increased on the basis of a revised authorisation in 2002.

Mercury losses from the chlor-alkali industry in 2012

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	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)	
FR/1	18 040	A	R	-8,26	0,10	0,08	0,015	0,47	0,48	0,66	0,00	-0,48	0,00	0,00	-26,44	17,53
FR/2	72 000	A	R	134,32	0,05	0,03	0,000	0,62	0,62	0,70	100,04	0,06	2,18	0,00	31,08	2,49
FR/3	222 128	M	R	8,16	0,02	0,00	0,002	1,05	1,05	1,07	7,97	0,00	0,22	0,00	0,98	-1,86
FR/4	127 550	M	R	13,99	0,02	0,26	0,014	0,49	0,50	0,78	4,36	0,03	0,00	0,00	0,21	8,64
FR/5	22 500	A	R	6,89	0,14	0,00	0,005	0,73	0,74	0,88	4,00	0,00	0,00	0,00	0,00	2,01
FR/6	166 000	M	R	10,84	0,04	0,08	0,000	0,65	0,65	0,77	0,03	0,00	0,00	0,00	0,00	10,04
<b>Total</b>	<b>628 218</b>															

## 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	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)	
DE/2	29 957	A	R	16,69	0,02	0,00	0,030	0,44	0,47	0,49	0,50	0,20	0,35	-0,20	11,68	4,02
DE/3	125 276	A	R	7,04	0,03	0,00	0,008	0,37	0,38	0,41	0,03	0,47	0,00	0,00	3,74	2,87
DE/5	170 000	A	R	56,47	0,03	0,01	0,000	0,68	0,68	0,72	2,44	7,41	2,62	-0,48	56,12	-2,81
DE/6	148 828	A	R	20,16	0,02	0,01	0,000	0,49	0,49	0,52	16,60	0,40	-0,30	0,00	0,67	2,36
DE/8	137 400	A	R	16,06	0,05	0,02	0,009	0,49	0,50	0,57	5,22	0,46	0,00	0,00	3,32	6,95
DE/9	167 000	A	R	15,85	0,04	0,02	0,086	0,60	0,69	0,75	0,00	0,00	0,00	2,35	14,09	1,01
<b>Total</b>	<b>778 462</b>															

Mercury losses from the chlor-alkali industry in 2012

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)	l (tonnes)	F (g/t)	
ES/1	31 373	M	R	42,04	0,10	0,01	0,002	0,64	0,65	0,76	18,82	0,00	0,42	0,00	13,42	9,04
ES/3	33 552	A	R	24,89	0,08	0,01	0,005	0,40	0,40	0,49	21,04	0,00	-0,01	0,00	-0,36	3,72
ES/4	115 200	M	R	23,35	0,03	0,02	0,003	0,32	0,32	0,38	20,10	0,00	0,02	0,00	0,21	2,67
ES/5	62 747	A	W	3,67	0,13	0,04	0,000	0,48	0,48	0,65	4,69	-0,03	0,00	0,00	-0,43	-1,25
ES/6	217 871	M	R	13,63	0,05	0,01	0,057	0,24	0,30	0,35	3,48	0,57	0,26	-0,24	2,68	7,12
ES/8	135 000	M	R	22,59	0,06	0,05	0,007	0,44	0,44	0,55	8,80	-0,59	0,00	0,00	-4,36	17,60
ES/9	47 496	A	R	-4,19	0,02	0,01	0,002	0,40	0,41	0,44	14,40	-1,35	0,00	0,00	-28,32	9,29
<b>Total</b>	<b>643 239</b>															

## 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	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)	
SE/2	120 000	A	R	27,75	0,01	0,00	0,000	0,14	0,14	0,15	0,00	-3,00	1,63	0,00	-11,39	38,99
<b>Total</b>	<b>120 000</b>															

Mercury losses from the chlor-alkali industry in 2012

Switzerland

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)	
CH/3	27 000	A	R	35,48	0,08	0,11	0,000	0,78	0,78	0,97	72,35	-1,02	0,00	0,00	-37,84	0,00
<b>Total</b>	<b>27 000</b>															

## United Kingdom

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)	l (tonnes)	F (g/t)	
UK/3	277 000	A	W	28,29	0,07	0,08	0,250	0,69	0,94	1,09	5,76	5,00	0,00	0,00	18,05	3,39
<b>Total</b>	<b>277 000</b>															

This plant is undergoing conversion to membrane technology and if the mercury losses are calculated only on the effective mercury capacity, then the value would be 1.58g/te.



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