OSPAR COMMISSION

Mercury losses from the Chlor-alkali industry in 2013

Hazardous Substances Series

2015

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 has been assessed by Anja Nowack (Germany).

Contents

Executive summary

This report presents the 2013 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 2011 to 2013 primarily due to the partial or full conversion of plants to membrane technology and the closing down of plants in Belgium, France and Germany.

Mercury losses through product, waste water and air have decreased about 28% from 2011 to 2013, continuing the decreasing trend since the mid-1990s. A large part of the decrease is due to the conversion of plants to membrane technology or the shut-down of plants. However, the 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 all the relevant countries leading to a total of about a 32% reduction from 2011 to 2013. All plants now comply with the limit value of 2 g Hg/t Cl2 for air emissions in PARCOM Decision 90/3.

The amount of mercury in safely deposited wastes has increased. 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 1998. Chlorine production capacity with mercury cells fell by 59% from 1998 to 2013 in the OSPAR maritime area.

Récapitulatif

Ce rapport présente les données 2013 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 ou complète à la technique à membrane et de la fermeture d'usines en Belgique, France et Allemagne, les capacités de production de chlore à base de cellules de mercure ont continué de décroître de 2011 à 2013.

Les pertes de mercure dans les produits, l'eau usée et l'air ont diminué d'environ 28 % entre 2011 et 2013, 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. Tous les pays pertinents notifient des réductions significatives dont le cumul représente une réduction d'environ 16,1 % entre 2009 et 2011. 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.

La quantité de mercure dans les déchets mis en décharges sécurisées a augmenté. 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 1998. La capacité de production de chlore à base des cellules de mercure a diminué de 59 % entre 1998 et 2013 dans la zone de la Convention.

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 81/1on 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 the 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 2013 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 2013 report on mercury losses from the chlor-alkali industry

On the basis of the data provided by Eurochlor and all Contracting Parties the following points are important to note:

- The mercury-cell-based chlorine production capacities have further decreased from 2011 to 2013 in the Convention area and in the actual catchment of the OSPAR maritime area. This can be mainly attributed to plants in Belgium (BE/1), France (FR/3) and Germany (DE/2) being shut down in 2012. This reduction amounts to 550 kt. A further reduction of mercury-cell-based chlorine production capacities from 2012 – 2013 can be attributed to the shutting down of the Wilhelmshaven (DE/6) plant in Germany where reported capacity proportional to time in production equated to a 46% reduction (68 kt). A site in France (FR/4) continued its progressive conversion with a 41% decrease in capacity from 2011-2013 equating to a 69kt reduction. Furthermore, a site in Spain (ES/4) reduced capacity by 28kt from 2012-2013 and a site in Germany (DE/8) increased capacity by 13kt in 2012. Thus the total mercury-cell-based capacity in the Convention area has been reduced by 702 kt (22%) since 2011. In the actual OSPAR catchment area the reduction amounts to 337 kt (20 %) since 2011.
- The summarised "Mercury Losses through Product, Waste Water and Air" from all plants have decreased about 28% from 2011 to 2013 (compared to reductions of 16 % from 2009 to 2011 and 26.8% from 2007 to 2009) closely following the trend since the mid-1990s. The single largest contributor to this decrease is France with 338 kg/y followed by UK (153 kg/y), Germany (104 kg/y), Belgium (48 kg/y) and Spain (25kg/y). Although a large part of the decrease is due to the conversion of plants to membrane technology, many plants managed to further decrease their specific emissions without reducing their mercury-based capacities. The range of mercury emissions (0,15 to 1,2 g/t in 2013) is smaller than in 2011 (0,13 to 1,75 g/t) and there continues to be a significant downward shift. Only 1 plant reported emission emissions >1 g/t (compared to 4 plants in 2011 and 9 plants in 2007) while the number of plants emitting <0.5 g/t has slightly grown to 9 (from 6 in 2009 and 8 in 2011). Most plants (12) emit between 0.5 and 1 g/t. It can be concluded that the conversion to membrane technology and shutdown of plants are the more common options than the reduction of emissions below the 0.5 g/t specific emission value.
- Air emissions have been significantly reduced since 2011 by 637 kg (32%). Again the greatest reduction is attributable to France with 315 kg followed by Germany (120 kg), the UK (116 kg), Belgium (27kg) and Spain (19kg). Switzerland and Sweden report a slight increase (4 kg each) although in the case of Switzerland this was due to an 8 kg increase from 2011-12 followed by a 4kg decrease from 2012-13 . Only 1 plant still reports emissions > 1g/t (UK/3 plant at 1,1 g/t), with SE/2 still showing the lowest atmospheric emissions with 0,14 g/t. However, 9 plants show an increase in atmospheric emissions.
- The EC Reference Document on Best Available Techniques in the Chlor-alkali Industry (December 2001) identified the mercury-free membrane process as BAT. For reference purposes only, it also listed the then best performing mercury-based chlor-alkali plants, which achieved losses to air of 0,17-0,3 g Hg/t Cl2 and overall losses to air, water and products in the range of 0,2-0,5 g Hg/t Cl2. The Swedish plant SE/2 that set this minimum has improved this performance (although it rose slightly from 2011-13 by 0,1 g Hg/t C12) but is still the exception with the closest contender ES/4 reporting 0,30 g Hg/t Cl2.
- About 55 t of mercury in safely deposited wastes (see definition in Tables 6 and 7) were reported for 2013. This was a significant increase from 37t in 2011. In general, figures do not necessarily correlate with any reported conversion or shutdown of plants. Also, since conversions are often stretched over several years and wastes can be temporarily stored on site, an increase does not pinpoint conversion efforts. It is helpful when plants provide more detailed information about on-going activities relevant for the interpretation of the reported data and related conclusions.

Reports of Contracting Parties on the intended future phasing-out of their national mercury-based chlor-alkali production capacities have previously been included in this report. The national plans on future phasing-out mercury-based chlor-alkali production capacities are now summarised in the document "Overview Assessment of Implementation of PARCOM Decision 90/3 on Reducing Atmospheric Emissions from Existing Chlor-Alkali Plants" and readers are referred to this document which can be found at the OSPAR website under "hazardous substances/implementation reports and implementation reporting formats" (www.ospar.org) for further information (OSPAR publication no. p00349). The companies operating mercury-cell-based plants have voluntarily agreed to phase out the technology by the year 2020 with the exception of such plants that produce specialties, for which the mercury-cell-based production line remains essential.

Altogether the reported data and resulting graphs on capacities, as well as on mercury discharges, emissions and losses show clearly the reductions achieved in the mercury-based chlor-alkali industry during the period 1998 to 2013: the chlorine production capacity with mercury cells was reduced by 57% in the OSPAR catchment area and by 59 % in the entire OSPAR Convention area. Over the same period, the total loss of mercury through product, waste water and air in the OSPAR Convention area was reduced by 82% and total atmospheric emissions of mercury in the entire OSPAR Convention area by 83%. The reductions of losses and emissions are more distinct than the reductions achieved in production capacities.

3. Evolution of mercury losses from the chlor-alkali industry (1982 - 2013)

The following figures give a rough indication of the evolution of mercury losses from the chlor-alkali industry in the period 1982-2013 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[1]. 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.

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.

[1] For plant codes in the tables see section 4.2.

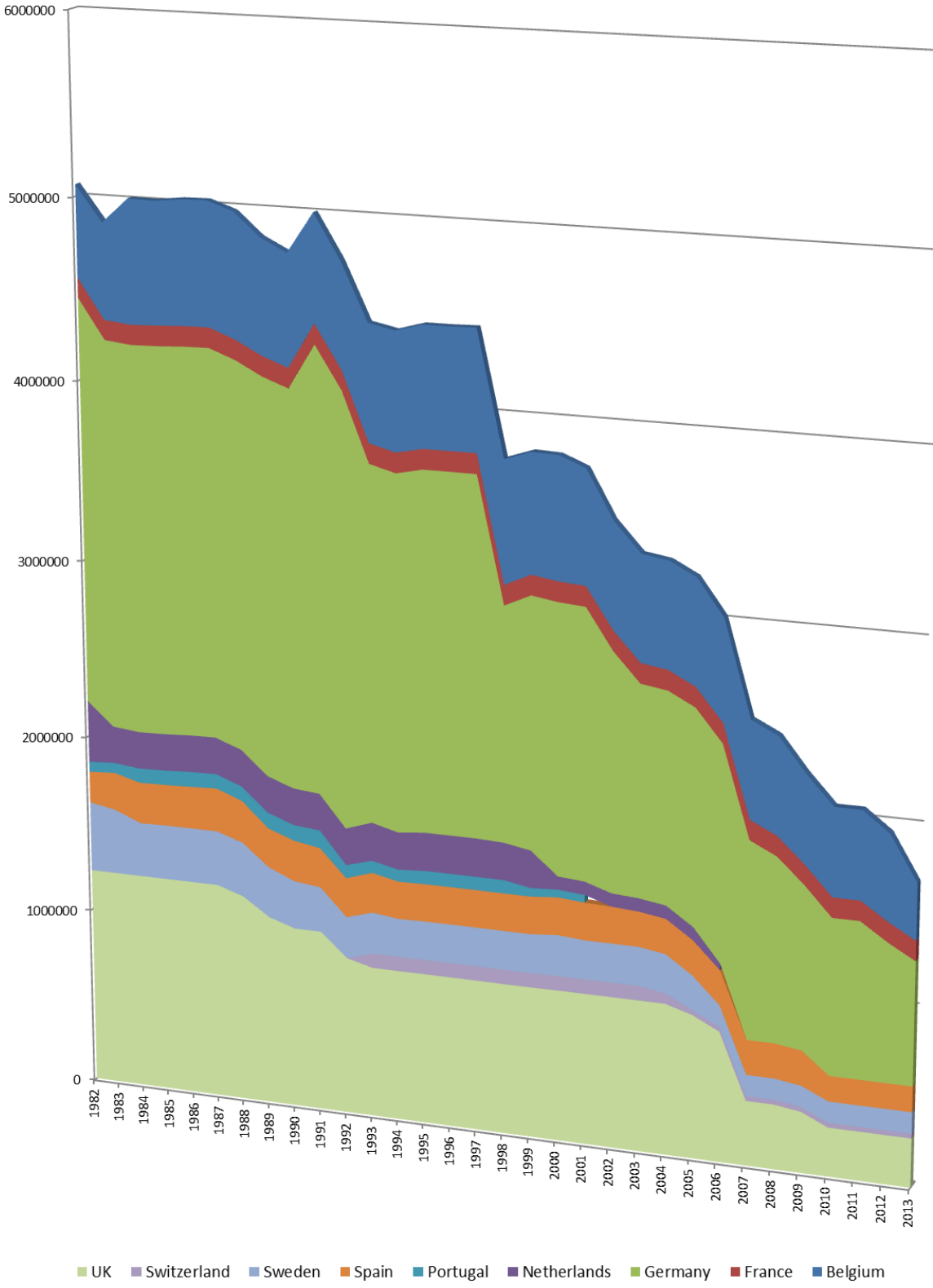

Figure 1a: Cumulative area chart showing chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area by Contracting Party (in kilotonnes per year)

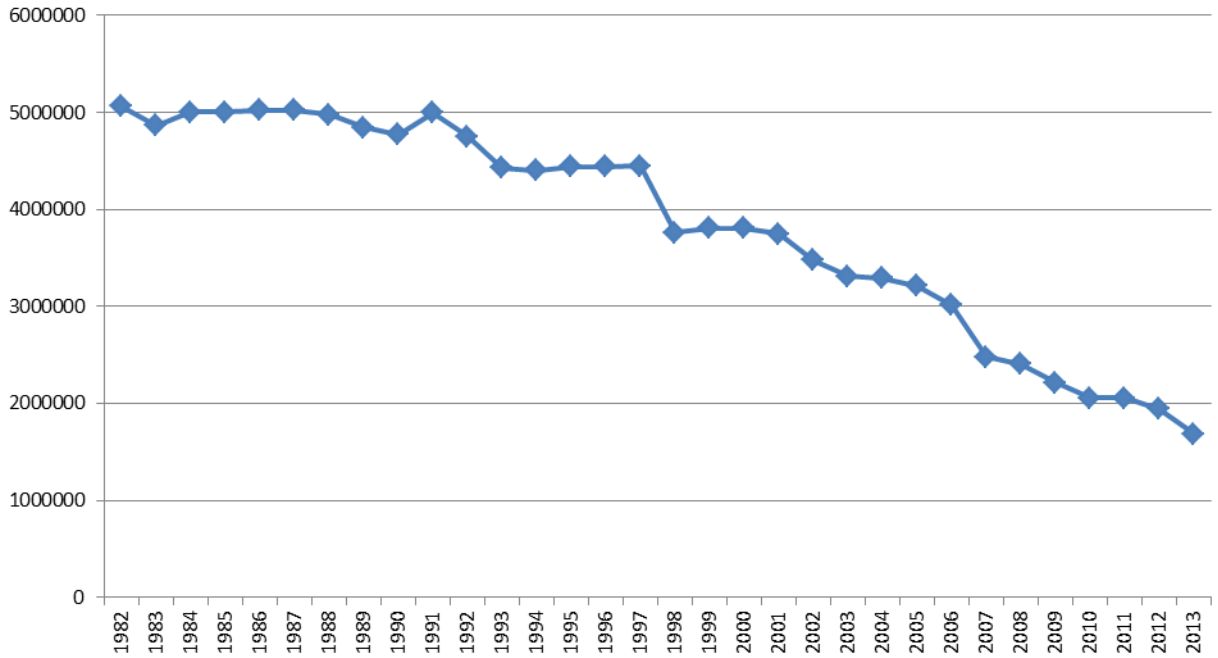

Figure 1b: Total chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area for all Contracting Parties (in kilotonnes per year)

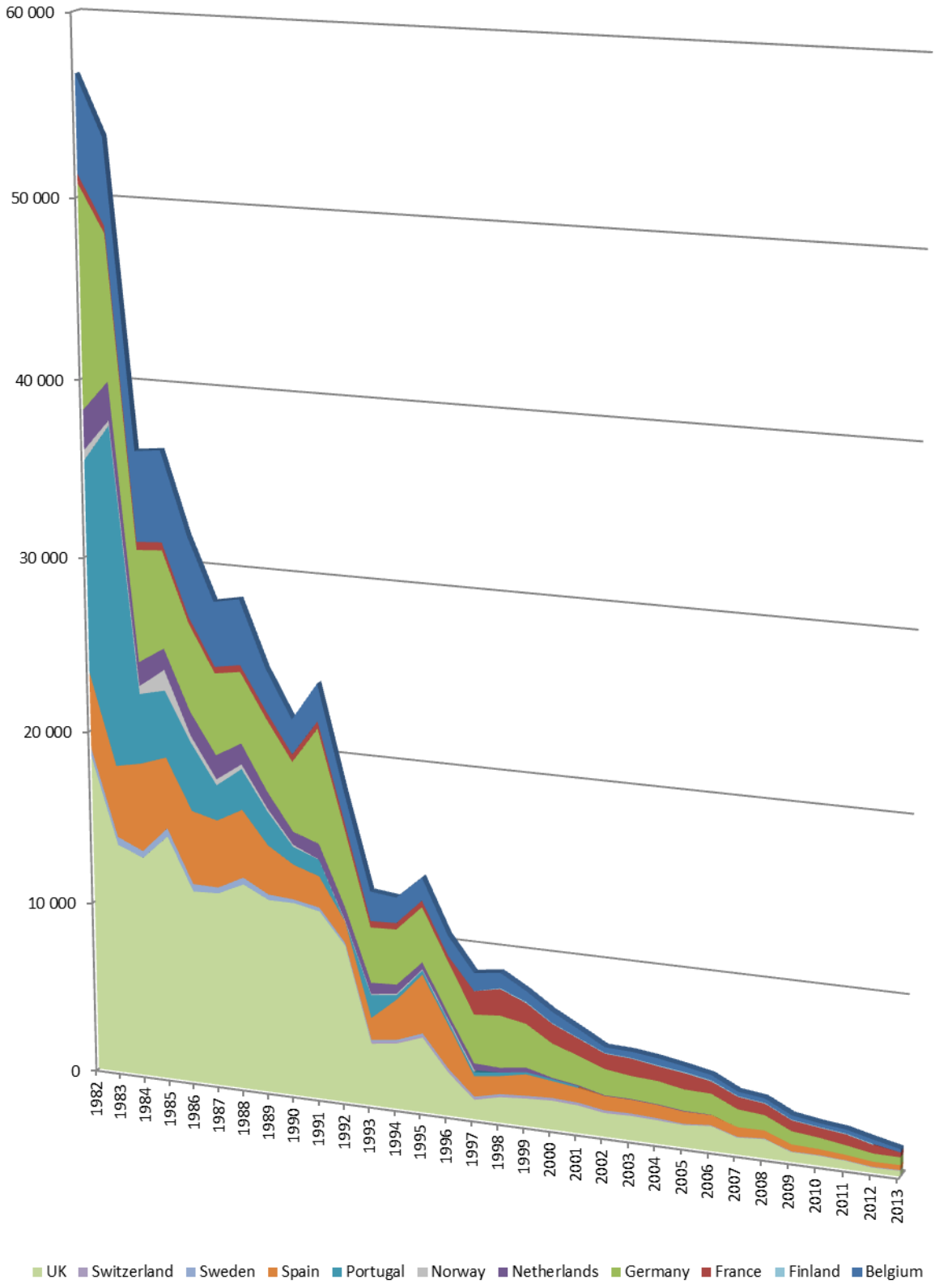

Figure 2a: Cumulative area chart showing mercury losses through product, wastewater and air (in kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants)

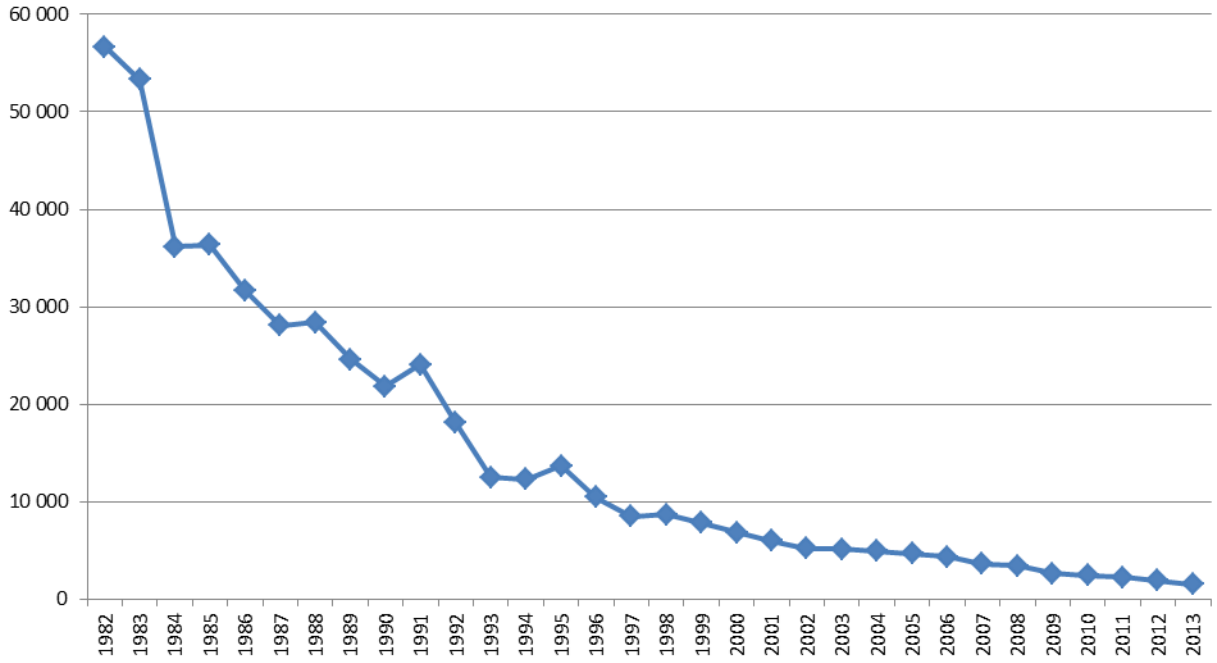

Figure 2b: Total mercury losses through product, wastewater and air for all Contracting Parties
(In kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants)

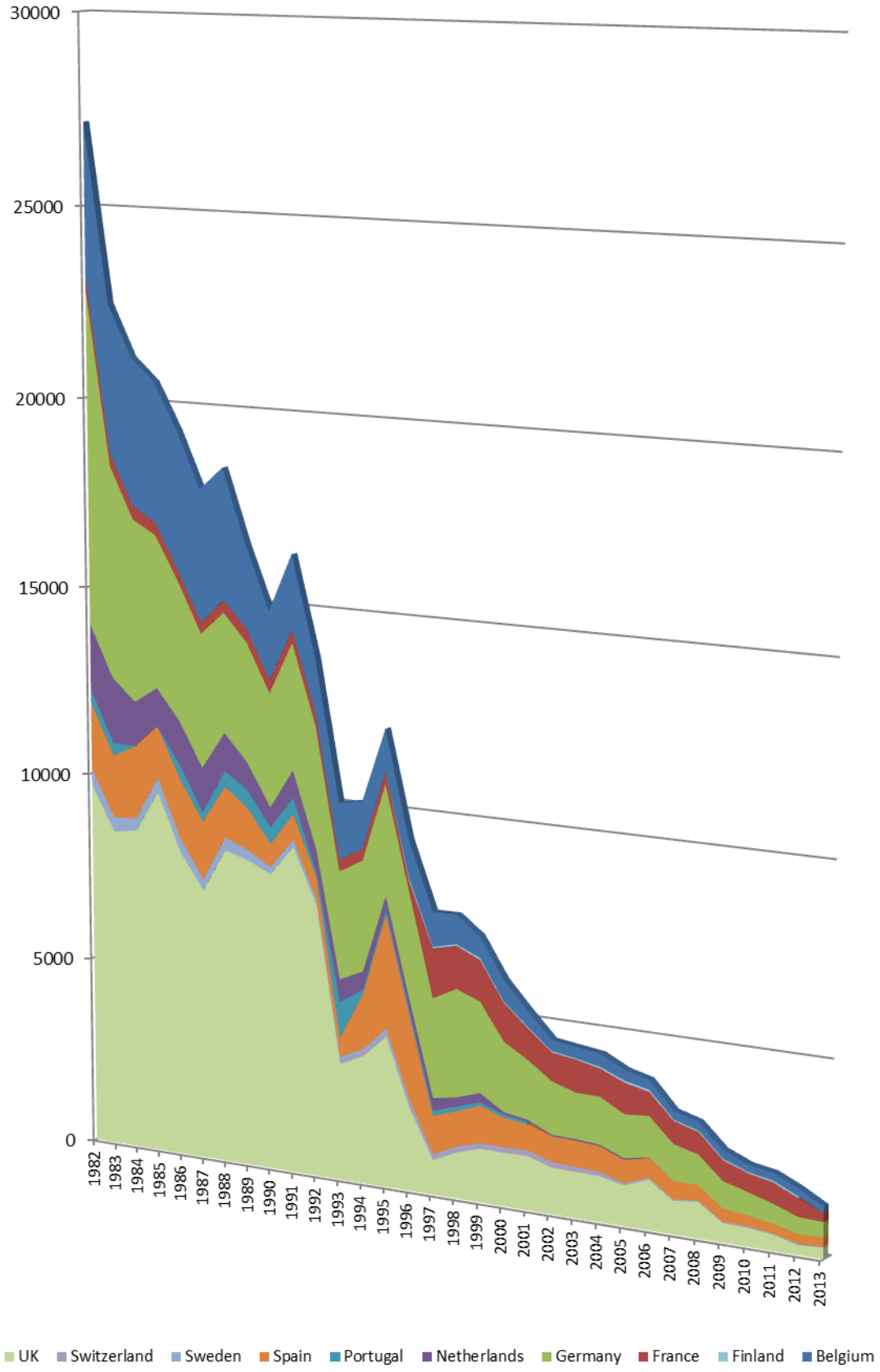

Figure 3a: Cumulative area chart showing atmospheric emissions of mercury from all plants from Contracting Parties (in kilograms per year, all plants)

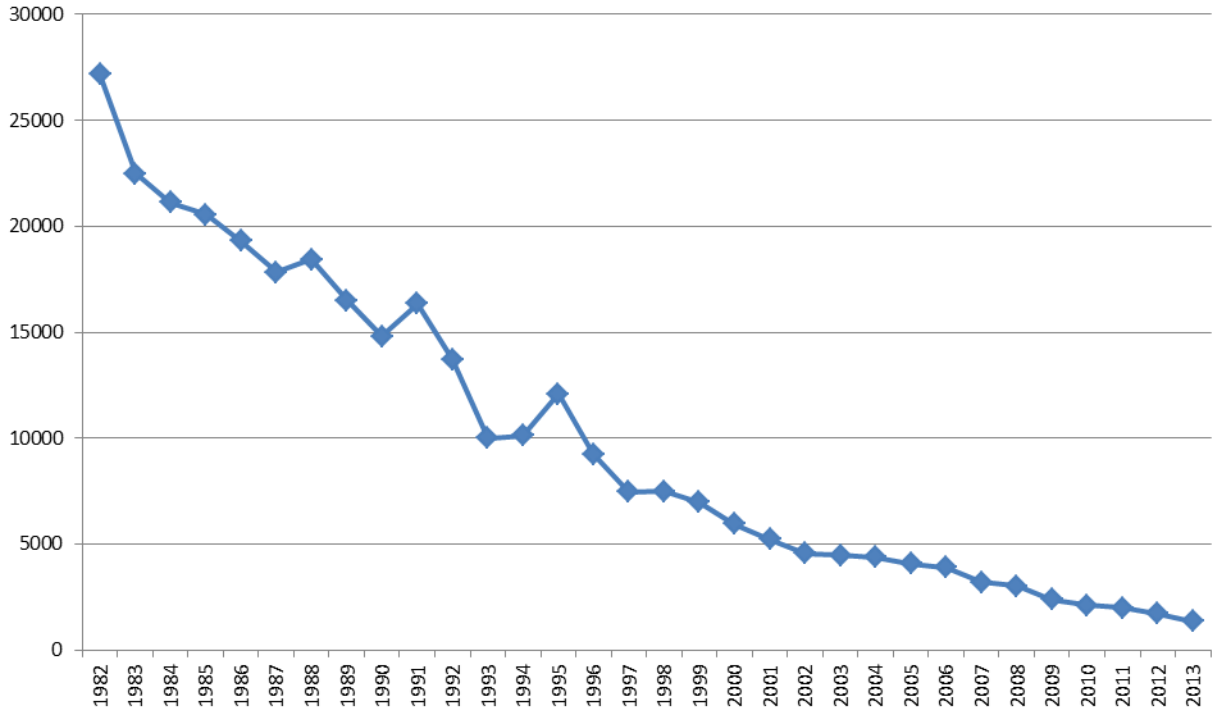

Figure 3b: Total atmospheric emissions of mercury from all plants for all Contracting Parties (in kilograms per year, all plants)

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
Belgium																
BE/1[2]*	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	SD
BE/2*	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	205000
BE/3*	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	110 000
BE/4*	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	N/A
Total	**679 900**	**662 000**	**679 900**	**630 663**	**589 000**	**589 000**	**589 000**	**589 000**	**566 500**	**544 000**	**544 000**	**495 000**	**495 000**	**495 000**	**482 006**	**315000**
Finland																
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	40 000
Total	**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**	40 000
France																
FR/1*	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	18040
FR/2*	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	72000
FR/3[2]	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	SD
FR/4[3]	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	100642
FR/5*	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	22500
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	166000
FR/7	184 300	184 300	184 300	184 300	184 300	184 300	184 300	184 300	SD	SD	SD	SD	SD	SD	SD	SD
Total	**873 810I**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**689 509**	**689 509**	**689 509**	**689 509**	**688 609**	**688 609**	**628 218**	**379182**
Germany																
DE/1	130 000	65 000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/2[2]*	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	SD
DE/3*	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	125276
DE/4*	150 000	300 000	300 000	300 000	153 000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/5*	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	170000
DE/6*	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	80808
DE/7*	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	N/I
DE/8*	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	150000
DE/9*	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	167000
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	SD
DE/11	50 000	60 000	9 804	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	72 000	157 000	157 000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/13*[4]	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	MT
DE/14[5]	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	MT
DE/15	120 000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**2344000**	**2010000**	**1760938**	**1595134**	**1416134**	**1265134**	**1265134**	**1290634**	**1295411**	**1192597**	**1119410**	**958 898**	**878 505**	**878 505**	**778 462**	**693084**

[2] 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.

[3] The production capacity of Jarrie (France) is reduced during 2012 due to a progressive conversion.

[4] The plant has converted to membrane technology; the reported “mercury” capacity is pro rata the time the plants were in production

[5] 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	2013
Netherlands																
NL/1*	70 000	70 000	74 294	74 294	74 294	74 294	74 294	74 294	37 452	SD	SD	SD	SD	SD	SD	SD
NL/2*	140 000	140 000	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**210 000**	**210 000**	**74 294**	**74 294**	**74 294**	**74 294**	**74 294**	**74 294**	**37 452**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Portugal																
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	NA
P/2*	26 400	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**75 000**	**48 000**	**43 302**	**43 302**												
Spain																
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	31373
ES/2*	14 815	15 000	14 815	14 815	9 877	PC	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	33552
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	87626
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	62747
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	217871
ES/7[6]	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	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	135000
ES/9*[7]	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	47496
Total	**763 232**	**761 500**	**771 291**	**771 291**	**766 353**	**756 476**	**756 476**	**756 476**	**756 475**	**756 475**	**756 475**	**741 892**	**643 239**	**643 239**	**643 239**	**615665**
Sweden																
SE/1*	100 000	100 000	100 000	100 000	100 000	100 000	100 000	74 355	SD	SD	SD	SD	SD	SD	SD	SD
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	120000
Total	**220 000**	**220 000**	**232 000**	**220 000**	**220 000**	**220 000**	**220 000**	**194 355**	**120 000**	**120 000**	**120 000**	**120 000**	**120 000**	**120 000**	**120 000**	**120 000**
Switzerland																
CH/1*	55 000	55 000	55 000	55 000	55 000	55 000	32 083	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/2	26 500	22 000	26 500	26 500	26 500	26 500	26 500	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	27 000
Total	**108 500**	**103 500**	**108 500**	**108 500**	**108 500**	**108 500**	**85 583**[8]	**27 000**	**27 000**	**27 000**	**27 000**	**27 000**	**27 000**	**27 000**	**27 000**	**27 000**
UK																
UK/1*	29 000	29 000	29 413	29 413	29 413	29 413	29 413	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/2*	89 872	89 000	89 872	89 872	89 872	89 872	89 872	74 855	SD	SD	SD	SD	SD	SD	SD	SD
UK/3*[9]	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	277 000
Total	**855 872**	**856 000**	**857 285**	**857 285**	**857 285**	**857 285**	**857 285**	**812 855**	**738 000**	**367 000**	**367 000**	**346 000**	**277 000**	**277 000**	**277 000**	**277 000**

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
tonnes	6170314	5784810	5441320	5214279	4947861	4786984	4764067	4660910	4272833	3739066	3665879	3420784	3169352	3169352	2995923	2466930

6 The plant has converted to membrane technology; the reported “mercury” capacity is pro rata the time the plants were in production

7 A restructuration 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.

8 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).

9 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.

%	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	39,2

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**
tonnes	3819424	3810540	3805143	3744906	3476003	3315126	3292209	3215551	3011775	2478009	2404822	2215487	2053839	2053839	1940802	1688419
%	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	43,2

NI: No information
N/A: Not applicable
PC: Partly converted to membrane technology
MT: Converted to membrane technology

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
Belgium																
BE/1	304	173	157	122	82	92	142	88	98	56	60	60	60	49	94	SD
BE/2	200	178	180	175	169	186	178	179	142	131	128	129	108	127	109	131
BE/3	168	113	111	88	78	85	82	60	64	67	64	59	52	53	49	50
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	N/A
Total	**893**	**637**	**649**	**505**	**329**	**363**	**402**	**327**	**304**	**254**	**252**	**248**	**220**	**229**	**252**	**181**
Finland																
SFR/1	49	63	43	41	44	37	56	59	63	42	42	41	40	50	50	ND
Total	**49**	**63**	**43**	**41**	**44**	**37**	**56**	**59**	**63**	**42**	**42**	**41**	**40**	**50**	**50**	
France																
FR/1	30	28	29	24	15	12	25	21	13	26	14	21	30	25	12	16
FR/2	117	129	119	121	92	118	116	125	119	122	104	85	99	72	50	63
FR/3	569	345	338	226	216	245	189	202	224	244	271	226	202	242	238	N/A
FR/4	221	192	220	203	152	127	96	106	119	111	100	105	123	109	99	75
FR/5	30	32	32	33	34	33	32	29	29	24	24	23	22	22	20	20
FR/6	217	190	152	139	175	185	147	168	195	188	145	159	95	148	128	106
FR/7	356	281	243	237	202	282	242	290	SD	SD	SD	SD	SD	SD	SD	SD
Total	**1149**	**1197**	**1133**	**983**	**886**	**1002**	**847**	**941**	**699**	**714**	**657**	**619**	**571**	**618**	**487**	**280**
Germany																
DE/1	118	111	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/2	203	147	247	159	127	128	103	94	97	85	77	72	61	82	15	SD
DE/3	277	49	73	75	78	80	92	86	91	104	120	53	49	51	51	58
DE/4	369	367	367	358	285	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/5	278	261	166	162	157	169	173	169	160	151	153	153	153	146	122	109
DE/6	98	70	62	52	49	77	116	64	97	74	95	111	104	67	77	33
DE/7	273	313	257	199	218	289	260	194	179	84	SD	SD	SD	SD	SD	N/I
DE/8	74	193	209	228	174	159	151	170	162	150	126	124	126	77	78	94
DE/9	184	161	165	197	199	213	244	243	207	170	146	192	162	124	125	149
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	SD
DE/11	69	104	18	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
DE/13	142	137	171	201	163	146	141	153	158	159	117	35	MT	MT	MT	MT
DE/14	285	100	112	80	67	64	62	56	55	52	45	20	MT	MT	MT	MT
DE/15	304	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**285**	**2536**	**1982**	**1711**	**1517**	**1325**	**1343**	**1229**	**1206**	**1029**	**878**	**759**	**655**	**547**	**469**	**443**
Netherlands																
NL/1	92	71	68	57	41	45	42	46	22	SD	SD	SD	SD	SD	SD	SD
NL/2	190	196	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**282**	**267**	**68**	**57**	**41**	**45**	**42**	**46**	**22**							
Portugal																
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	NA
P/2	60	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**202**	**130**	**121**	**100**												
Spain																
ES/1	122	61	63	58	48	45	46	38	35	30	24	24	22	21	24	22
ES/2	79	30	29	25	16	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
ES/3	34	66	57	52	38	42	32	30	27	23	21	18	17	17	16	16
ES/4	140	287	164	114	123	137	121	121	110	102	103	78	53	48	44	29
ES/5	216	142	102	101	86	74	92	47	29	34	40	42	31	36	41	36
ES/6	62	182	182	193	185	199	205	203	154	156	89	96	111	94	76	93
ES/7	223	53	49	32	36	30	26	25	25	24	20	8	MT	MT	MT	MT
ES/8	45	251	244	176	174	174	154	139	137	120	97	88	80	73	74	68
ES/9	136	175	95	103	132	99	94	109	68	70	68	50	29	20	21	20
Total	**1057**	**1247**	**985**	**854**	**838**	**800**	**770**	**713**	**585**	**560**	**463**	**404**	**334**	**309**	**297**	**284**
Sweden																
SE/1	24	27	28	29	26	22	25	14	SD	SD	SD	SD	SD			SD
SE/2	41	18	19	18	17	19	22	20	20	20	22	17	17	16	18	18
Total	**65**	**45**	**47**	**47**	**43**	**41**	**47**	**34**	**20**	**20**	**22**	**17**	**17**	**16**	**18**	**18**
Switzerland																
CH/1	62	82	70	64	73	67	39	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/2	23	19	20	28	19	19	11	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/3	26	15	19	25	17	12	22	30	32	20	21	18	26	16	26	21
Total	**111**	**116**	**109**	**117**	**109**	**98**	**72**	**30**	**32**	**20**	**21**	**18**	**26**	**16**	**26**	**21**
UK																
UK/1	14	15	16	17	18	35	54	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/2	106	125	144	157	175	144	154	112	SD	SD	SD	SD	SD	SD	SD	SD
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	332
Total	**1493**	**1616**	**1695**	**1613**	**1381**	**1416**	**1363**	**1295**	**1444**	**983**	**1 097**	**567**	**565**	**485**	**302**	**332**

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	2013
kg/year	8179	7854	6832	6028	5188	4933	4730	4450	4192	3499	3322	2562	2324	2163	1901	1559
%	100	96,0	83,5	73,3	63,4	60,3	57,8	54,4	51,3	42,8	40,6	31	28,4	26,4	23,2	17,9

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

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
Belgium																
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	SD
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	0,64
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	0,46
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	N/A
Finland																
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	
France																
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	0,88
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	0,88
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	SD
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	0,75
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	0,91
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	0,64
FR/7	1,93	1,522	1,320	1,286	1,094	1,530	1,312	1,574	SD	SD	SD	SD	SD	SD	SD	SD
Germany																
DE/1	1,72	1,707	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	SD
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	0,46
DE/4	1,23	1,223	1,223	1,193	1,862	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	0,64
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	0,41
DE/7	1,5	1,740	1,410	1,130	1,240	1,640	1,479	1,101	1,018	1,156	SD	SD	SD	SD	SD	SD
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	0,63
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	0,89
DE/10	0,98	1,576	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/11	2,17	1,740	1,864	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
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	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	MT
DE/15	1,52	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Netherlands																
NL/1	0,99	1,008	0,909	0,765	0,551	0,610	0,571	0,615	0,587	SD	SD	SD	SD	SD	SD	SD
NL/2	1,5	1,400	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Portugal																
P/1	2,64	2,700	2,800	2,300	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
P/2	NI	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
Spain																
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	0,72
ES/2	2,25	2,020	1,948	1,667	1,626	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
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	0,47
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	0,33
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	0,58
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	0,43
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	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	0,5
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	0,42
Sweden																
SE/1	0,44	0,268	0,278	0,288	0,258	0,221	0,248	0,186	SD	SD	SD	SD	SD	SD	SD	SD
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	0,15
Switzerland																
CH/1	1,12	1,490	1,271	1,162	1,336	1,227	1,227	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/2	NI	0,877	0,743	1,054	0,699	0,712	0,429	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	0,79
UK																
UK/1	0,64	0,525	0,538	0,574	0,606	1,180	1,852	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/2	1,29	1,410	1,600	1,744	1,950	1,600	1,710	1,494	SD	SD	SD	SD	SD	SD	SD	SD
UK/3[10]	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	1,2

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

[10] 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.

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
Belgium																
BE/1	290	156	137	106	68	74	120	67	79	43	50	54	42	37	55	SD
BE/2	176	154	157	153	153	164	160	164	129	122	121	121	102	119	103	126
BE/3	146	101	98	74	63	62	64	49	49	52	50	47	42	44	45	47
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	N/A
Total	**772**	**558**	**564**	**413**	**284**	**300**	**344**	**280**	**257**	**217**	**222**	**221**	**186**	**200**	**203**	**173**
Finland																
SFR/1	40	53	35	34	39	31	46	54	57	37	39	38	37	46	50	ND
Total	**40**	**53**	**35**	**34**	**39**	**31**	**46**	**54**	**57**	**37**	**39**	**38**	**37**	**46**	**50**	
France																
FR/1	26	25	26	21	12	7	14	11	11	12	12	19	24	20	9	12
FR/2	111	115	103	108	80	103	106	113	109	96	96	76	94	66	45	57
FR/3	301	320	313	210	202	235	181	191	212	226	259	219	192	238	233	SD
FR/4	179	182	188	171	109	88	67	64	89	84	74	72	87	75	64	49
FR/5	330	25	25	26	27	27	26	24	24	19	19	18	18	17	17	17
FR/6	24	161	129	109	147	142	118	139	172	159	117	129	68	120	108	84
FR/7	160	255	223	186	170	255	217	275	SD	SD	SD	SD	SD	SD	SD	SD
Total	**1131**	**1083**	**1007**	**831**	**747**	**857**	**729**	**818**	**617**	**596**	**577**	**532**	**482**	**534**	**475**	**219**
Germany																
DE/1	173	105	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/2	92	135	235	146	114	113	98	88	88	78	73	68	56	78	14	SD
DE/3	84	39	63	68	71	74	86	80	84	82	88	46	43	46	48	52
DE/4	255	353	353	345	274	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/5	256	255	160	155	150	163	167	162	153	144	146	146	146	139	116	102
DE/6	105	66	58	48	45	72	111	59	48	70	90	106	100	63	73	31
DE/7	128	301	244	187	206	276	247	181	166	80	SD	SD	SD	SD	SD	SD
DE/8	280	175	171	179	141	113	114	142	141	139	111	111	110	69	69	75
DE/9	150	149	151	185	188	203	233	232	195	158	136	182	145	117	115	133
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	N/A
DE/11	105	100	18	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	103	119	128	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/13	97	124	158	177	144	135	131	142	148	148	104	34	MT	MT	MT	MT
DE/14	285	96	110	74	65	62	60	54	53	51	42	20	MT	MT	MT	MT
DE/15	238	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**2705**	**2399**	**1849**	**1564**	**1398**	**1211**	**1248**	**1140**	**1079**	**950**	**790**	**712**	**600**	**512**	**434**	**392**
Netherlands																
NL/1	65	65	65	53	37	42	40	42	20	SD	SD	SD	SD	SD	SD	SD
NL/2	180	178	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**245**	**243**	**65**	**53**	**37**	**42**	**40**	**42**	**20**							

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
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	N/A
P/2	28	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**120**	**91**	**82**	**69**												
Spain																
ES/1	31	38	45	36	33	38	40	32	30	26	19	21	20	19	20	19
ES/2	21	20	19	17	12	PC	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	13
ES/4	210	218	118	69	80	114	105	101	92	92	89	66	42	40	37	26
ES/5	109	91	85	91	77	63	74	38	20	20	26	27	18	22	30	26
ES/6	126	157	165	178	171	182	193	188	146	144	83	90	99	85	65	78
ES/7	48	35	27	22	28	26	22	22	22	21	18	7	MT	MT	MT	MT
ES/8	203	227	204	155	148	151	128	117	117	101	82	69	63	57	59	55
ES/9	123	152	74	84	112	81	85	93	59	62	61	46	27	19	19	19
Total	**937**	**989**	**780**	**684**	**684**	**686**	**670**	**613**	**509**	**483**	**394**	**341**	**284**	**255**	**245**	**236**
Sweden																
SE/1	37	25	25	27	23	20	23	13	SD	SD	SD	SD	SD	SD	SD	SD
SE/2	21	17	17	17	15	16	20	18	19	18	20	16	16	14	17	17
Total	**58**	**42**	**42**	**44**	**38**	**36**	**43**	**31**	**19**	**18**	**20**	**16**	**16**	**14**	**17**	**17**
Switzerland																
CH/1	57	75	63	58	69	65	38	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/2	18	19	19	27	18	18	11	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/3	21	10	14	17	14	8	17	22	27	15	17	11	14	13	21	17
Total	**96**	**104**	**96**	**102**	**101**	**91**	**66**	**22**	**27**	**15**	**17**	**11**	**14**	**13**	**21**	**17**
UK																
UK/1	14	14	14	13	13	29	49	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/2	106	117	137	149	169	137	147	108	SD	SD	SD	SD	SD	SD	SD	SD
UK/3	1107	1292	1269	1270	1048	1053	1010	958	1322	876	951	509	493	421	260	305
Total	**1227**	**1423**	**1420**	**1432**	**1230**	**1219**	**1206**	**1066**	**1322**	**876**	**951**	**509**	**493**	**421**	**260**	**305**

Total atmospheric emissions of mercury from all installations in the OSPAR Convention area[1]

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
kg/year	7331	6985	5940	5226	4558	4475	4392	4066	3906	3197	3009	2380	2112	1996	1705	1359
%	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	18,5

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

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	2013
Belgium																
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	SD
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	0,61
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	0,43
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	N/A
Finland																
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	ND
France																
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	0,68
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	0,80
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	SD
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	0,48
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	0,75
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	0,51
FR/7	0,960	1,381	1,210	1,011	0,921	1,384	1,176	1,494	SD	SD	SD	SD	SD	SD	SD	SD
Germany																
DE/1	1,330	1,610	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	SD
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	0,41
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	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	0,60
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	0,39
DE/7	0,800	1,670	1,340	1,060	1,170	1,570	1,405	1,030	0,952	1,093	SD	SD	SD	SD	SD	SD
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	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	0,80
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	N/A
DE/11	2,100	1,660	1,846	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	1,431	0,760	0,815	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	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	MT
DE/15	1,980	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Netherlands																
NL/1	0,920	0,927	0,873	0,716	0,501	0,560	0,542	0,559	0,546	SD	SD	SD	SD	SD	SD	SD
NL/2	1,230	1,270	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Portugal																
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	N/A
P/2	1,061	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD

Site	1998	1999	2000	2001	2002	2003	2004	2005	2010	2007	2008	2009	2010	2011	2012	2013
Spain																
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	0,61
ES/2	1,430	1,330	1,272	1,153	1,166	PC	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	0,40
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	0,30
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	0,42
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	0,36
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	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	0,41
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	0,40
Sweden																
SE/1	0,370	0,250	0,250	0,270	0,234	0,204	0,231	0,173	SD	SD	SD	SD	SD	SD	SD	SD
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	0,14
Switzerland																
CH/1	1,030	1,370	1,146	1,065	1,258	1,176	1,176	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/2	0,680	0,848	0,710	1,019	0,670	0,689	0,408	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	0,64
UK																
UK/1	0,483	0,470	0,461	0,452	0,438	1,004	1,669	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/2	1,179	1,310	1,520	1,660	1,880	1,520	1,640	1,446	SD	SD	SD	SD	SD	SD	SD	SD
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	1,10

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

Table 6: Mercury in Safely Deposited Wastes* (kg per year)[11]

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Belgium																
BE/1	3784	837	6823	260	2889	2293	4608	5405	304	1928	367	0	1076	1311	2073	SD
BE/2	4513	5733	3566	4646	358	NI	250	5 949	1 139	3802	2702	6723	2003	1615	2329	205
BE/3	1	3	5	6	67	6	5	3	6	3	0	3	4	109	3	4
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	N/A
Total	**8403**	**6573**	**10 396**	**6154**	**3254**	**2299**	**4863**	**11357**	**1449**	**5733**	**3070**	**6726**	**3083**	**3036**	**4405**	**209**
Finland																
SFR/1	0	0	0,16	0	0	0	0	0	0,2	0,3	0,21	0	0	0	1814	ND
Total	**0**	**0**	**0,16**	**0**	**0**	**0**	**0**	**0**	**0,2**	**0,3**	**0,21**	**0**	**0**	**0**	**1814**	
France																
FR/1	42	0	0	0	18	33	75	17	0	0	0	0	0	0	0	4
FR/2	47	68	2632	9644	8896	6230	7268	7309	10 428	4858	7156	3876	7041	7291	7203	13993
FR/3	1298	1257	1296	1078	922	1323	1143	1423	2106	1066	1268	1090	1062	1229	1770	SD
FR/4	207	54	37	43	41	34	26	34	0	20	34	0	0	0	556	5
FR/5	250	0	70	6	238	13	3	NI	2,5	3	3	3	0	80	90	811
FR/6	25	33	16	64	48	25	15	9	18	18	0	6	9	10	5	5
FR/7	33	24	35	8	25	24	44	32	SD	SD	SD	SD	SD	SD	SD	SD
Total	**1902**	**1436**	**4086**	**10 843**	**10 188**	**7682**	**8574**	**8824**	**12 555**	**5965**	**8461**	**4975**	**8112**	**8609**	**9624**	**14818**
Germany																
DE/1	47	31	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/2	28	4	0	NI	NI	NI	138	182	120	85	65	13	91	65	15	SD
DE/3	2519	2	3	2	1	NI	NI	NI	3	207	223	4	3	3	4	17
DE/4	1806	3054	3054	1259	3437	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/5	411	66	576	766	5799	10 555	10 027	4958	1762	2514	855	0	454	0	415	21874
DE/6	2180	1314	3764	1034	472	1591	1551	496	1386	5602	1726	2987	1607	4376	2470	2373
DE/7	12 594	37 260	20 602	13 200	13 390	12 260	16 490	15 330	59 991	55 830	SD	SD	SD	SD	SD	SD
DE/8	1	1646	2311	NI	674	2282	1536	356	358	553	431	804	961	916	717	3708
DE/9	1480	2270	4570	4230	6366	5340	4355	3239	3241	0	2324	4401	4538	2492	0	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	N/A
DE/11	196	19	NI	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
DE/13	3547	2692	5659	9209	4378	2745	2500	2780	2309	1888	120109	5058	MT	MT	MT	MT
DE/14	1064	1656	754	833	406	85	212	71	96	72	6289	2862	MT	MT	MT	MT
DE/15	1720	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**27 958**	**50 494**	**41 469**	**30 533**	**34 923**	**34 858**	**36 808**	**27 412**	**63 266**	**66 751**	**132 023**	**16 129**	**7655**	**7851**	**3621**	**27972**

* 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.

11 In 2012, data for 1998 for indiividual installations were obtained from EuroChlor. As a result there were changes for some of the total.

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Netherlands																
NL/1	38	6	2	28	7	3	2	1	0	SD	SD	SD	SD	SD	SD	SD
NL/2	0	0	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**38**	**6**	**2**	**28**	**7**	**3**	**2**	**1**	**0**							
Portugal																
P/1	615	0	0	0	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
P/2	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Total	**615**	**0**	**0**	**0**	**0**	**0**	**0**									
Spain																
ES/1	84	1265	4276	495	2027	846	408	1297	807	1107	627	1807	904	1102	590	1150
ES/2	48	27	8	9	141	PC	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	361
ES/4	2208	2694	6279	4868	2343	2020	2837	3549	3938	2899	3147	3802	1898	1894	2315	1007
ES/5	1	1013	412	59	0	440	1544	1880	208	161	44	514	232	195	294	210
ES/6	496	604	770	1088	2339	2625	622	900	1043	3776	906	940	1109	2497	758	925
ES/7	20	20	10	3	13	14	NI	315	9	11	0	219	MT	MT	MT	MT
ES/8	379	498	432	459	552	328	506	633	551	1035	652	490	424	343	1188	2126
ES/9	197	500	401	279	169	349	185	217	156	1105	1220	500	2350	664	684	780
Total	**3844**	**7005**	**13 187**	**7619**	**8056**	**7301**	**6503**	**9114**	**7082**	**10 470**	**6970**	**8742**	**7801**	**7391**	**6536**	**6559**
Sweden																
SE/1	0	6	6	850	5	NI	55	NI	NI	SD	SD	SD	SD	SD	SD	SD
SE/2	2	1	1	1	NI	NI	NI	NI	NI	0	0	0	4238	4682	0	0
Total	**2**	**7**	**7**	**851**	**5**	**NI**	**55**	**NI**	**0**	**0**	**0**	**0**	**4238**	**4682**	**0**	**0**
Switzerland																
CH/1	327	165	178	215	207	239	139	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/2	NI	0	3	32	1	2	1	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/3	1073	1084	0	1933	NI	1891	NI	1859	0	1948	1787	1074	1865	0	1953	833
Total	**1 905**	**1249**	**181**	**2180**	**208**	**2132**	**140**	**1859**	**0**	**1948**	**1787**	**1074**	1865	0	**1953**	**833**
UK																
UK/1	140	161	268	263	136	118	246	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/2	17	37	48	147	113	119	134	43	SD	SD	SD	SD	SD	SD	SD	SD
UK/3	3032	3911	3092	2842	10 745	21 247	6208	6446	15 905	11 703	1659	2315	2485	5313	1596	5019
Total	**3189**	**4109**	**3408**	**3252**	**10 994**	**21 484**	**6588**	**6489**	**15 905**	**11 703**	**1659**	**2315**	**2485**	**5313**	**1596**	**5019**

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

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
Belgium																
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	SD
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	1,00
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	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	N/A
Finland																
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	ND
France																
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	0,23
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	194,35
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	SD
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	0,05
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	36,04
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	0,03
FR/7	0,18	0,131	0,190	0,044	0,134	0,131	0,237	0,172	SD	SD	SD	SD	SD	SD	SD	SD
Germany																
DE/1	0,68	0,480	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	SD
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	0,14
DE/4	6,02	10,180	10,180	4,197	22,464	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	128,67
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	29,37
DE/7	69,2	207,000	113,200	75,000	76,080	70	93,693	87,102	306,767	766,780	SD	SD	SD	SD	SD	SD
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	24,72
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	0
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	N/A
DE/11	6,13	0,310	0	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
DE/12	1,46	1,120	1,120	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	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	MT
DE/15	8,6	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	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.

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Netherlands																
NL/1	0,51	0,082	0,027	0,382	0,100	0,043	0,029	0,008	0	SD	SD	SD	SD	SD	SD	SD
NL/2	0	0	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
Portugal																
P/1	14,2	0	0	0	N/A	N/A	N/A	N/A	N/A	SD	SD	SD	SD	SD	SD	SD
P/2	NI	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	36,36
ES/2	3,23	1,800	0,556	0,607	14,300	PC	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	10,75
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	11,49
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	3,35
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	4,25
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	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	15,75
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	16,43
Sweden																
SE/1	0	0,064	0,064	8,500	0,052	NI	0,553	NI	SD	SD	SD	SD	SD	SD	SD	SD
SE/2	0,02	0,011	0,010	0,010	NI	NI	NI	NI	0	0	0	8,95	35,32	39,02	0	0
Switzerland																
CH/1	5,95	3,000	3,230	3,900	3,774	4,350	4,350	SD	SD	SD	SD	SD	SD	SD	SD	SD
CH/2	NI	0	0,104	1,216	0,021	0,061	0,030	SD	SD	SD	SD	SD	SD	SD	SD	SD
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	30,85
UK																
UK/1	4,75	5,540	9,115	8,938	4,631	4,001	8,359	SD	SD	SD	SD	SD	SD	SD	SD	SD
UK/2	0,19	0,420	0,530	1,640	1,260	1,330	1,490	0,573	SD	SD	SD	SD	SD	SD	SD	SD
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	18,12

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

MT: Converted to membrane technology

4. 2013 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
Belgium			
BE/1	Solvin	Lillo	Shut down in 2012
BE/2	Tessenderlo	Tessenderlo	Only the period of time in production before the definitive shut down considered
BE/3	Solvin	Antwerpen	
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	
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
Germany			
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	Shut down 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.
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
The Netherlands			
NL/1	Akzo Nobel	Hengelo	Shut down in 2007
NL/2	Solvay	Linne-Herten	Decommissioned in 1999

Country/Code	Company	Location	Status
Portugal			
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
Spain			
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	
Sweden			
SE/1	Akzo Nobel	Bohus	This plant was shut down
SE/2	Ineos	Stenungsund	Verified value
Switzerland			
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	
United Kingdom			
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.

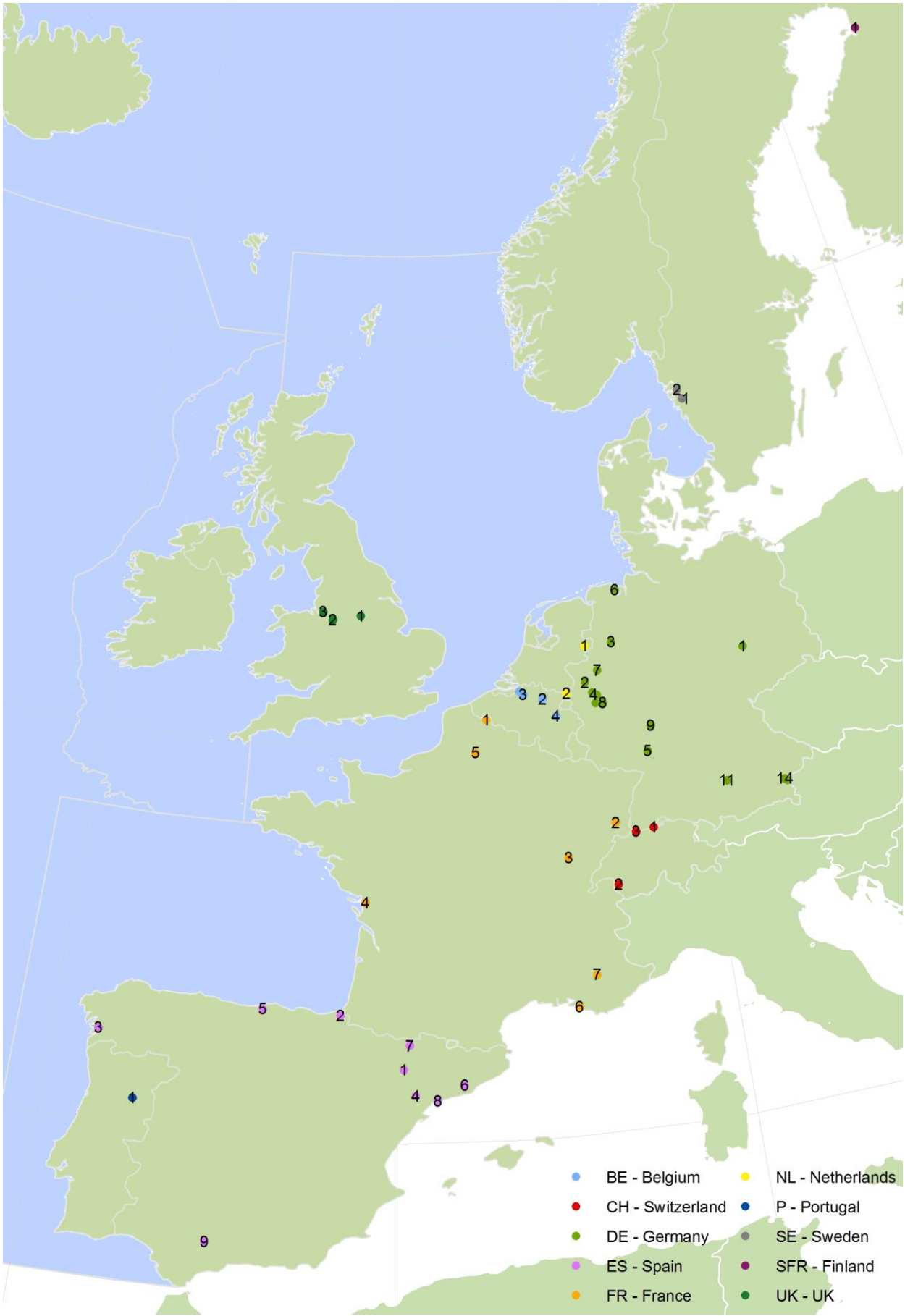

Figure 4: Map showing the location of the mercury-based chlor-alkali plants in the OSPAR Maritime Area

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

Belgium

Site	Chlorine production capacity with Hg-cells	Sea area	Brine W or R	Mercury consumption	Losses via products	Discharges via waste water	Emissions to the atmosphere			Total emissions Discharges losses	Mercury in Wastes					Difference to balance
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
	(tonnes)			C (g/t)	E1 (g/t)	E2 (g/t)	2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)	(g/t)	D (g/t)	c (tonnes)	f (tonnes)	I (tonnes)	F (g/t)	DB (g/t)
BE02	205000	A	R	10,98	0,02	0,01	0,002	0,61	0,61	0,64	1,00	0,62	1,29	0,00	9,34	0,00
BE03	110000	A	R	14,26	0,02	0,01	0,059	0,37	0,43	0,46	0,03	-0,46	0,00	0,00	-4,19	17,96
Total	**315000**															

Finland

Site	Chlorine production capacity with Hg-cells	Sea area	Brine W or R	Mercury consumption	Losses via products	Discharges via waste water	Emissions to the atmosphere			Total emissions Discharges losses	Mercury in Wastes					Difference to balance
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
				C	E1	E2	2.3.1	2.3.2	E3		D	c	f	I	F	DB
	(tonnes)			(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(tonnes)	(tonnes)	(tonnes)	(g/t)	(g/t)
SFR/1	40000	Baltic	R				0,015	1,105		1,22						
Total	**40000**															

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

France

Site	Chlorine production capacity with Hg-cells	Sea area	Brine W or R	Mercury consumption	Losses via products	Discharges via waste water	Emissions to the atmosphere			Total emissions Discharges losses	Mercury in Wastes					Difference to balance
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
	(tonnes)			C (g/t)	E1 (g/t)	E2 (g/t)	2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)	(g/t)	D (g/t)	c (tonnes)	f (tonnes)	I (tonnes)	F (g/t)	DB (g/t)
FR01	18040	A	R	-16,02	0,13	0,06	0,043	0,64	0,68	0,88	0,23	-0,75	0,00	0,00	-41,35	24,22
FR02	72000	A	R	221,88	0,07	0,02	0,023	0,78	0,80	0,88	194,35	-0,36	-1,32	3,48	25,07	1,58
FR04	100642	M	R	-2,21	0,01	0,25	0,018	0,46	0,48	0,75	0,05	0,03	0,00	0,00	0,26	-3,25
FR05	22500	A	R	40,93	0,15	0,00	0,006	0,74	0,75	0,91	36,04	0,00	0,81	0,00	0,00	3,98
FR06	166000	M	R	10,77	0,04	0,09	0,000	0,51	0,51	0,64	0,03	0,59	0,00	0,00	3,52	6,57
Total	**379182**															

Germany

Site	Chlorine production capacity with Hg-cells	Sea area	Brine W or R	Mercury consumption	Losses via products	Discharges via waste water	Emissions to the atmosphere			Total emissions Discharges losses	Mercury in Wastes					Difference to balance
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
	(tonnes)			C (g/t)	E1 (g/t)	E2 (g/t)	2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)	(g/t)	D (g/t)	c (tonnes)	f (tonnes)	I (tonnes)	F (g/t)	DB (g/t)
DE03	125276	A	R	2,82	0,05	0,00	0,006	0,41	0,41	0,46	0,14	-0,11	0,00	0,00	-0,88	3,10
DE05	170000	A	R	70,10	0,03	0,01	0,000	0,60	0,60	0,64	128,67	-13,95	-15,23	18,56	-60,66	1,45
DE06	80808	A	R	18,56	0,02	0,00	0,000	0,39	0,39	0,41	29,37	-0,60	-0,60	0,00	-14,85	3,64
DE08	150000	A	R	18,99	0,06	0,07	0,009	0,49	0,50	0,63	24,72	-1,84	0,00	0,00	-13,38	7,02
DE09	167000	A	R	14,74	0,08	0,02	0,086	0,71	0,80	0,89	0,00	0,00	0,00	2,54	15,20	-1,35
Total	**693084**															

Spain

Site	Chlorine production capacity with Hg-cells	Sea area	Brine W or R	Mercury consumption	Losses via products	Discharges via waste water	Emissions to the atmosphere			Total emissions Discharges losses	Mercury in Wastes					Difference to balance
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
	(tonnes)			C (g/t)	E1 (g/t)	E2 (g/t)	2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)	(g/t)	D (g/t)	c (tonnes)	f (tonnes)	I (tonnes)	F (g/t)	DB (g/t)
ES01	31373	M	R	49,95	0,10	0,01	0,002	0,60	0,61	0,72	36,64	0,00	0,26	0,00	8,41	4,17
ES03	33552	A	R	18,78	0,06	0,01	0,003	0,40	0,40	0,47	10,75	0,00	0,00	0,00	0,04	7,51
ES04	87626	M	R	14,72	0,02	0,02	0,003	0,29	0,30	0,33	11,49	0,00	0,00	0,00	0,05	2,85
ES05	62747	A	W	5,74	0,11	0,05	0,000	0,42	0,42	0,58	3,35	-0,05	0,00	0,00	-0,80	2,61
ES06	217871	M	R	15,66	0,04	0,03	0,060	0,30	0,36	0,43	4,25	-0,24	0,58	0,08	1,95	9,04
ES08	135000	M	R	41,91	0,03	0,06	0,002	0,41	0,41	0,50	15,75	2,54	0,00	0,00	18,84	6,82
ES09	47496	A	R	24,51	0,02	0,01	0,002	0,39	0,40	0,42	16,43	0,00	0,00	0,00	0,00	7,66
Total	**615665**															

Sweden

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

Switzerland

Site	Chlorine production capacity with Hg-cells	Sea area	Brine W or R	Mercury consumption	Losses via products	Discharges via waste water	Emissions to the atmosphere			Total emissions Discharges losses	Mercury in Wastes					Difference to balance
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
	(tonnes)			C (g/t)	E1 (g/t)	E2 (g/t)	2.3.1 (g/t)	2.3.2 (g/t)	E3 (g/t)	(g/t)	D (g/t)	c (tonnes)	f (tonnes)	I (tonnes)	F (g/t)	DB (g/t)
CH03	27000	A	R	31,63	0,08	0,07	0,000	0,64	0,64	0,79	30,85	0,00	0,00	0,00	0,00	-0,01
Total	**27000**															

United Kingdom

Site	Chlorine production capacity with Hg-cells	Sea area	Brine W or R	Mercury consumption	Losses via products	Discharges via waste water	Emissions to the atmosphere			Total emissions Discharges losses	Mercury in Wastes					Difference to balance
							Process exhaust	Cellroom	Total		Disposed off	Awaiting recovery	Awaiting disposal	Awaiting decision	Temporarily stored	
				C	E1	E2	2.3.1	2.3.2	E3		D	c	f	I	F	DB
	(tonnes)			(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(g/t)	(tonnes)	(tonnes)	(tonnes)	(g/t)	(g/t)
UK03	277000	A	W	266,41	0,05	0,05	0,290	0,81	1,10	1,20	18,12	113,60	0,00	0,00	410,11	-163,02
Total	**277000**															

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.

OSPAR COMMISSION

Victoria House
37-63 Southampton Row
London WC1B 4DA
United Kingdom

t: +44 (0)20 7430 5200
f: +44 (0)20 7242 3737
e: secretariat@ospar.org
www.ospar.org

OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

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