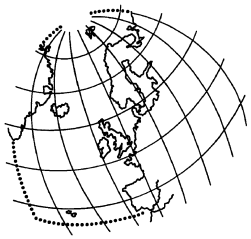
Hazardous Substances Series

Mercury Losses from the Chlor-Alkali Industry in 2005



OSPAR Commission
2007

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. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

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. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, 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 et la Suisse et approuvée par la Communauté européenne et l'Espagne.

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contents

Executive Summary

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 2005 data on production capacities, atmospheric emissions of mercury, and the amount of mercury in safely deposited wastes as well as an assessment of both the 2004 and 2005 data and the trends.

Reports on the intended future phasing-out of national mercury-based chlor-alkali production capacities, previously included in this report series, are now included in the "Overview Assessment of the Implementation of PARCOM Decision 90/3 on Reducing Atmospheric Emissions from Existing Chlor-Alkali Plants".

The data have been reported using the reporting formats and procedures agreed by OSPAR in 2003 (reference number 2003-5), which set out the requirements for data and information to be provided via Euro Chlor.

The mercury-cell-based chlorine production capacities have decreased since 1998, but generally remained unchanged over the last few years with a small decrease from 2004 to 2005.

Mercury losses through product, waste water and air have decreased about 10% from 2003 to 2005, following the decreasing trend over the last years. Looking at single plants gives a more heterogeneous picture with some Contracting Parties reporting increases in 2004 and decreases in 2005. Other Contracting Parties show reversed trends.

Over the years, atmospheric emissions of mercury have been significantly reduced.. The situation is similar to that of total mercury losses from products, waste water and air i.e. some Contracting Parties reporting increases in 2004 and decreases in 2005 and other showing reversed trends.

All plants still comply with the limit value of 2 g Hg/t Cl_2 for air emissions in PARCOM Decision 90/3, and in many plants, air emissions continue to fall. However, there is still a disparity of one order of magnitude between some plants.

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. OSPAR will in future seek more detailed information to explain year-to-year differences in the amount of mercury in safely deposited wastes.

On the whole, the figures over the years from 1998 are encouraging reflecting decreases in losses and emissions almost half way to the cessation target for 2010, as recommended in PARCOM Decision 90/3.

Récapitulatif

Le présent rapport prend la suite de la série de rapports annuels sur les rejets, les émissions et les pertes de mercure empruntant toutes les voies de pénétration, provenant des installations d'électrolyse des chlorures alcalins à cellules de mercure. Le rapport présente les données de 2005 sur les capacités de production, les émissions atmosphériques du mercure et la quantité de mercure dans les déchets mis en décharges sécurisées. Il présente également une évaluation des données de 2004 et de 2005 et des tendances.

Les rapports relatifs aux intentions d'abandon, dans l'avenir, des capacités nationales de production des chlorures alcalins à base de mercure, qui figuraient auparavant dans le présent rapport, sont désormais intégrés à la « Synthèse d'évaluation de la mise en œuvre de la décision PARCOM 90/3 sur la réduction des émissions atmosphériques des installations existantes d'électrolyse des chlorures alcalins ».

Les données ont été soumises en utilisant les formulaires de notification et les procédures convenus par OSPAR en 2003 (numéro de référence 2003-5), lesquels font état des exigences des données et des informations à fournir par le biais d'Euro Chlor.

Les capacités de production du chlore à cellules de mercure sont en baisse depuis 1998 mais, d'une manière générale, elles restent inchangées au cours de ces dernières années tout en accusant une faible baisse de 2004 à 2005.

Les pertes de mercure provenant des produits, des eaux usées et de l'atmosphère ont diminué d'environ 10% entre 2003 et 2005, s'alignant ainsi sur la tendance à la baisse observée ces quelques dernières années. Lorsque l'on considère des usines individuelles, on obtient un résultat plus hétérogène. Certaines Parties contractantes notifient des augmentations en 2004 et des diminutions en 2005, d'autres des tendances inverses.

Les émissions atmosphériques de mercure ont considérablement diminué au cours des ans. La situation est similaire à celle des pertes de mercure total provenant des produits, des eaux usées et de l'atmosphère, c'est-à-dire que certaines Parties contractantes ont notifié des augmentations en 2004 et des diminutions en 2005 et d'autres des tendances inverses.

Toutes les usines se conforment encore aux valeurs limites de 2 g Hg/t Cl_2 pour les émissions atmosphériques qui sont stipulées dans la Décision PARCOM 90/3 et dans de nombreuses usines, les émissions atmosphériques continuent à diminuer. Une disparité de l'ordre de magnitude de un subsiste encore entre certaines usines.

Les quantités de mercure dont on dispose en sécurité ont augmenté. Certains pays notifient des augmentations, d'autres des baisses, mais ces changements ne correspondent pas nécessairement à la fermeture de cellules ou d'usines. A l'avenir OSPAR demandera des informations plus détaillées justifiant les différences, d'une année à l'autre, entre les quantités de mercure dont on dispose en sécurité.

Dans l'ensemble, les statistiques sont encourageantes depuis 1998. Elles représentent une baisse des pertes et des émissions et se situent à mi chemin de l'objectif de cessation de 2010 que recommande la Décision PARCOM 90/3.

1. Introduction

Since the beginning of the 1980s, mercury discharges, emissions and losses from the chlor-alkali industry have been addressed under the former Paris Commission (PARCOM). The following Decisions and Recommendations are applicable under the OSPAR Convention:

- PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chlor-alkali Plants (exit of the purification plant), 1980;
- PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981;
- PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981;
- PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982;
- PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985;
- PARCOM Decision 90/3 on Reducing Atmospheric Emissions from Existing Chlor-Alkali Plants.

In 1983, Contracting Parties to the former Paris Convention initiated an annual reporting of mercury discharges, emissions and losses from their national chlor-alkali industry. These data were compiled by the OSPAR Secretariat and, following examination by the relevant subsidiary bodies, published by the Commission in form of Annual Reports on Mercury Losses from the Chlor-alkali Industry, which comprised yearly data series from 1982 onwards.

Over time, reporting requirements and formats were 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 Hazardous Substances Committee (HSC) of the OSPAR Commission adopted in 2003 the current reporting formats and procedures (see OSPAR agreement; reference 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 confirmation by Contracting Parties, compiles these technical data in form of a report.

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.

2. Assessment of the report on mercury losses from the Chlor-Alkali industry

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

a. as already observed for the last years, **the mercury-cell-based chlorine production capacities** have generally stayed the same with a small decrease from 2004 to 2005. The reported production capacities of all installations in the Convention area and for installations in the drainage area to the maritime area decreased from 2004 to 2005 about 104 kilo tonnes and 77 kilo tonnes respectively. These differences are based on the shut down of two plants in Switzerland (CH/1 and CH/2) and the shutdown of one plant in the UK (UK1). Furthermore, one plant reduced its production (Sweden/1) by 25 kilo tonnes, which in the overall picture was compensated by the increase of production of two German plants (D/2 and D/5).

b. The summarised "**Mercury Losses through Product, Waste Water and Air**" from all plants have decreased about 10% from 2003 to 2005, which is following the general trend of appr. 5 % decrease per year. Looking at the development of single plants over the last years, offers a heterogenous picture with 40 % of all plants having had increases of mercury losses in 2004 and decreases in 2005. Some summarised figures for contracting parties also show reversed trends when comparing 2003, 2004 and 2005 data. The most remarkable reductions of total mercury losses in 2005 was observed for Germany (-114 kg) and Belgium (-75 kg, both after increased losses in 2004), for UK (due to shut down of one plant) and Switzerland (missing data), while substantial increases were observed for the plants in France (after drastic decreases in 2004). The data show that there is still a wide range – one order of magnitude - of specific Mercury Losses through Product, Waste Water and Air, from 0.17 (Sweden/2) to 1.6 (UK/3) g per tonne;

c. Figures for **air emissions of mercury** have slightly decreased for 2004. For 2005 an overall decrease of 8 % can be observed, which is mostly related to the shut down of 2 plants and the missing data for 1 plant. Analog to the heterogenous picture for mercury losses from product, waste water and air (s.a.), both decreases and increases of air emissions were observed with some reversed trends between 2003 and 2005. Significant reductions for 2005 are reported from Germany (107 kg, after an increase of 37 kg in 2004), Belgium (64 kg after an increase of 44 kg in 2004), Spain (57 kg), Switzerland (44 kg, data for one plant not included), and from UK (40 kg,). The emission reduction reported by Sweden (12 kg, after an increase of 7 kg in 2004) is equivalent to 25 % of total emissions. An increase of emission was reported by France (89 kg, after remarkable reductions of 128 kg in 2004).

   All plants still comply with the limit value of 2 g Hg/t Cl_2 for air emissions in PARCOM Decision 90/3, and in many plants, air emissions continue to fall. However, according to the data in Table 5, 19 out of 36 plants reported increased emissions in 2004; for 2005, increased emissions were reported for 13 out of 34 plants. So there is no clear uniform overall trend. A wide range – one order of magnitude - in actual values (from 0.15 to 1.49 g Hg/t Cl_2) is still present. 6 plants (out of 34) achieve emission values below 0,5 g Hg/t Cl_2 (which is in the range of the best performing plants in Europe), 24 plants (out 34) achieve emission levels below 1 g Hg/t Cl_2 (which is an international discussed limit value, e.g. at UNECE) and 10 plants (out of 34) have reported emissions into air above 1 g Hg/t Cl_2 , the plant with the by far highest production capacity being among the latter. The extent to which these values are considered to reflect BAT in general or only for individual plants concerned is not fully clear. However, the EC Reference Document on Best Available Techniques in the Chlor-Alkali Industry (December 2001) identified techniques used in the best performing mercury-based chlor-alkali plants, which achieve losses to air, water and with products in the range of 0.2-0.5 g Hg/t Cl_2 .

d. Over the last years (see Table 6), the amount of **mercury in safely deposited wastes** has increased. The data are variable however, with some countries showing decreases and some showing increases and the range of values is extremely large. The definition of "safely deposited wastes" is given in Tables 6 and 7 and possibly needs a long term observation to understand trends and changes. The increases or decreases do however not necessarily correlate to the shutdown of cells or plants all over the countries. The increasing figures of some plants do not correspond to any changes in capacity or conversion activities and can not be explained by changes of capacity or conversion activities. For a better understanding the background for the drastic changing figures, it would still be helpful in future to have a comprehensible explanation of the year to year differences, and whether these are due to pure mercury from decommissioned cells being returned to the market or used in other plants, or for other reasons.

Reports 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 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.

Altogether the reported figures show clearly the **results of the efforts**, which have been achieved during the last five years. While the chlorine production capacity with mercury cells was reduced from 1998 to 2005 to about 84 % of the capacity in 1998 in the drainage area to the maritime area, and to about 75 % in the Convention area, the parameter "mercury losses through product, waste water and air" and the parameter "atmospheric emissions of mercury" were reduced in a more forced rate to about 55 %, which is almost **half way to the cessation target** for 2010, which is recommended in the PARCOM Decision 90/3.

3. Evolution of mercury losses from the chlor-alkali industry (1982-2005)

The following figures give a rough indication of the evolution of mercury losses from the chlor-alkali industry in the period 1982-2005 as follows:

Figure 1: Chlorine Production Capacity with Mercury Cells;

Figure 2: Mercury Losses through Product, Waste Water and Air;

Figure 3: 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 pre-1999 data, 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, the 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.

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.

A further source 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 will also assist 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 4.1.

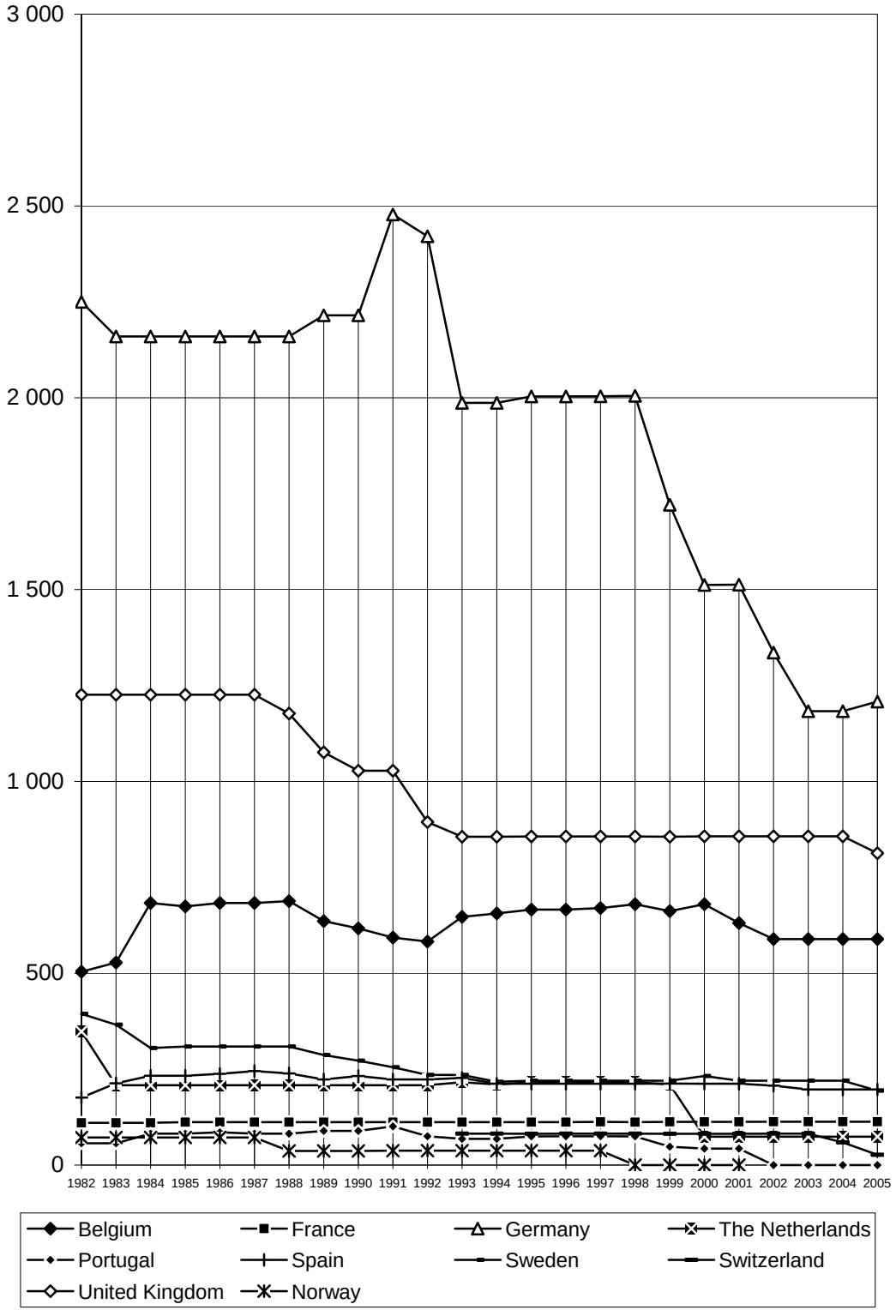


Figure 1: Chlorine Production Capacity with Mercury Cells of plants discharging into the OSPAR catchment area
(in kilotonnes per year)

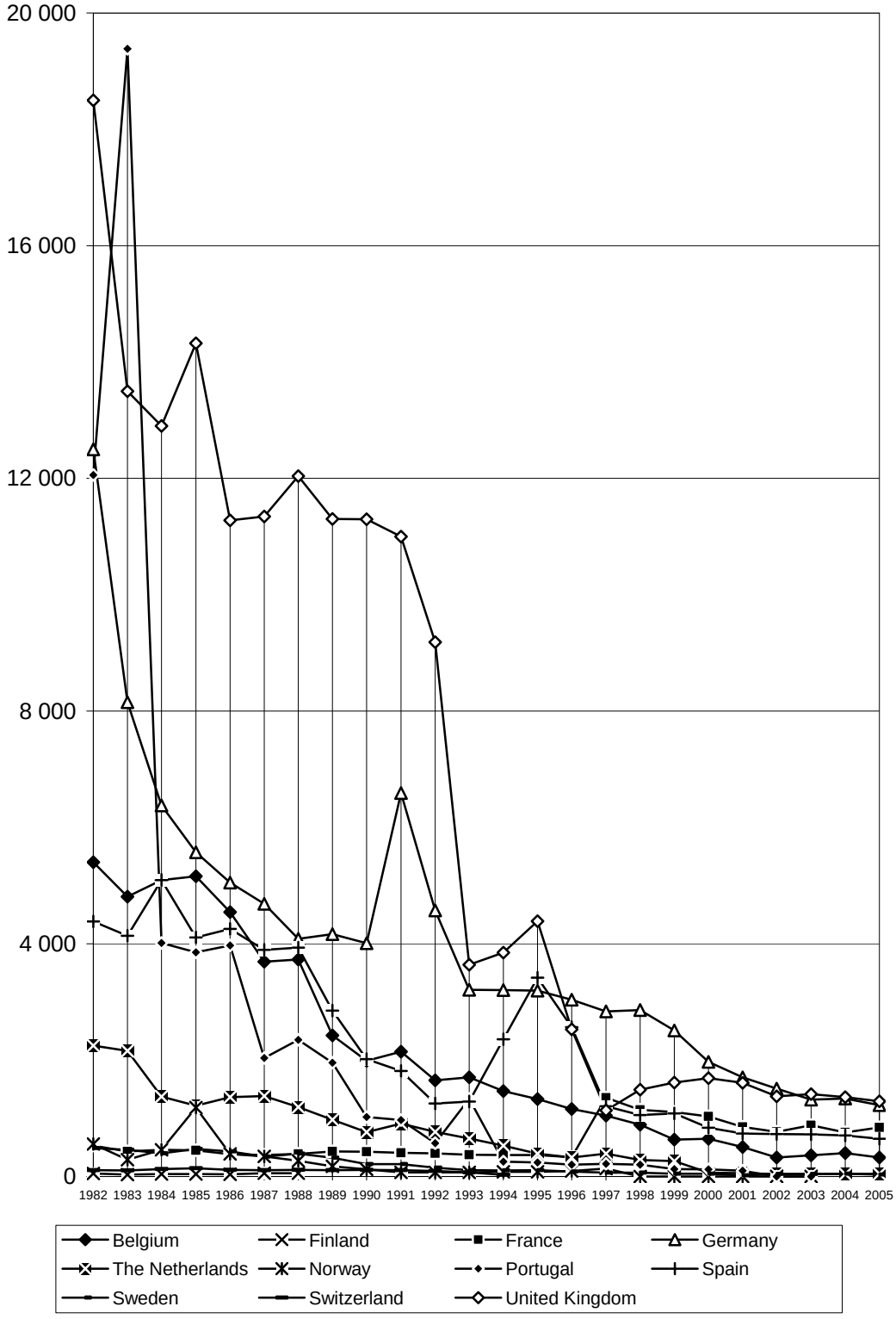


Figure 2: **Mercury Losses through Product, Wastewater and Air**
(in kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants)

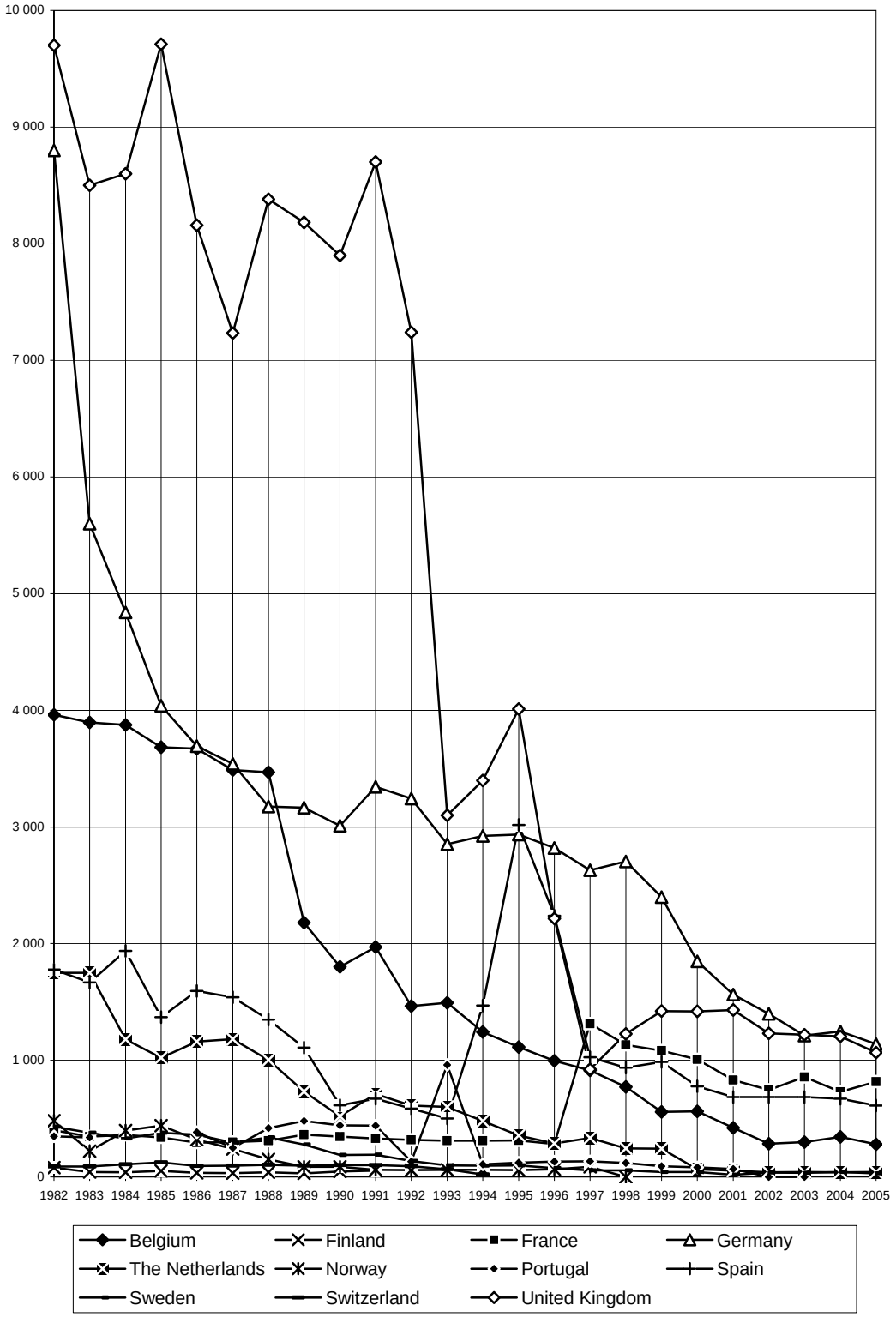


Figure 3: Atmospheric Emissions of Mercury from all plants of Contracting Parties
(in kilograms per year, all plants)

Table 1: Chlorine Production Capacity with Hg-cells (tonnes) from all plants (Asterisk indicates plants discharging into maritime area only)

Site	1998	1999	2000	2001	2002	2003	2004	2005
Belgium								
B/1*	219 000	230 000	219 000	219 000	219 000	219 000	219 000	219 000
B/2*	250 000	250 000	250 000	250 000	250 000	250 000	250 000	250 000
B/3*	120 000	100 000	120 000	120 000	120 000	120 000	120 000	120 000
B/4*	90 900	82 000	90 900	41 663	NA	NA	NA	NA
Total	**679 900**	**662 000**	**679 900**	**630 663**	**589 000**	**589 000**	**589 000**	**589 000**
Finland								
SF/1	40 000	40 000	40 000	40 000	42 485	42 485	42 485	42 485
Total	**40 000**	**40 000**	**40 000**	**40 000**	**42 485**	42 485	**42 485**	**42 485**
France								
F/1*	NI	18 040	18 040	18 040	18 040	18 040	18 040	18 040
F/2*	NI	72 000	72 000	72 000	72 000	72 000	72 000	72 000
F/3	NI	240 900	240 900	240 900	240 900	240 900	240 900	240 900
F/4	NI	170 070	170 070	170 070	170 070	170 070	170 070	170 070
F/5*	NI	22 500	22 500	22 500	22 500	22 500	22 500	22 500
F/6	NI	166 000	166 000	166 000	166 000	166 000	166 000	166 000
F/7	NI	184 300	184 300	184 300	184 300	184 300	184 300	184 300
Total	**NI**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**
Germany								
D/1	130 000	65 000	NA	NA	NA	NA	NA	NA
D/2*	130 000	130 000	140 000	140 000	110 000	110 000	110 000	130 000
D/3*	120 000	120 000	125 000	125 000	125 000	125 000	125 000	125 000
D/4*	150 000	300 000	300 000	300 000	153 000	NA	NA	NA
D/5*	180 000	150 000	160 000	160 000	160 000	160 000	160 000	165 500
D/6*	65 000	130 000	148 828	148 828	148 828	148 828	148 828	148 828
D/7*	160 000	180 000	182 000	176 000	176 000	176 000	176 000	176 000
D/8*	200 000	98 000	135 951	135 951	135 951	135 951	135 951	135 951
D/9*	150 000	150 000	160 000	167 000	167 000	167 000	167 000	167 000
D/10	300 000	248 000	NA	NA	NA	NA	NA	NA
D/11	50 000	60 000	9 804	NA	NA	NA	NA	NA
D/12	72 000	157 000	157 000	NA	NA	NA	NA	NA
D/13*	157 000	150 000	160 000	160 000	160 000	160 000	160 000	160 000
D/14	300 000	72 000	82 355	82 355	82 355	82 355	82 355	82 355
D/15	120 000	NA	NA	NA	NA	NA	NA	NA
Total	**2 344 000**	**2 010 000**	**1 760 938**	**1 595 134**	**1 416 134**	**1 265 134**	**1 265 134**	**1 290 634**
Netherlands								
NL/1*	70 000	70 000	74 294	74 294	74 294	74 294	74 294	74 294
NL/2*	140 000	140 000	NA	NA	NA	NA	NA	NA
Total	**210 000**	**210 000**	**74 294**	**74 294**	**74 294**	**74 294**	**74 294**	**74 294**
Portugal								
P/1*	48 600	48 000	43 302	43 302	NA	NA	NA	NA
P/2*	26 400	NA	NA	NA	NA	NA	NA	NA
Total	**75 000**	**48 000**	**43 302**	**43 302**	**NA**	**NA**	**NA**	**NA**
Spain								
E/1	31 920	30 000	31 373	31 373	31 373	31 373	31 373	31 373
E/2*	14 815	15 000	14 815	14 815	9 877	NI	NI	NI
E/3*	33 552	33 500	33 552	33 552	33 552	33 552	33 552	33 552
E/4	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000
E/5*	62 745	63 000	62 747	62 747	62 747	62 747	62 747	62 747
E/6	209 200	209 000	217 871	217 871	217 871	217 871	217 871	217 871
E/7	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000
E/8	135 000	135 000	135 004	135 004	135 004	135 004	135 004	135 004
E/9*	101 000	101 000	100 929	100 929	100 929	100 929	100 929	100 929
Total	**763 232**	**761 500**	**771 291**	**771 291**	**766 353**	**756 476**	**756 476**	**756 476**
Sweden								
S/1*	100 000	100 000	100 000	100 000	100 000	100 000	100 000	74 355
S/2*	120 000	120 000	132 000	120 000	120 000	120 000	120 000	120 000
Total	**220 000**	**220 000**	**232 000**	**220 000**	**220 000**	**220 000**	**220 000**	**194 355**
Switzerland								

Site	1998	1999	2000	2001	2002	2003	2004	2005
CH/1*	55 000	55 000	55 000	55 000	55 000	55 000	32 083	Shut down
CH/2	26 500	22 000	26 500	26 500	26 500	26 500	26 500	Shut down
CH/3*	27 000	26 500	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**[2]	**27 000**

UK								
UK/1*	29 000	29 000	29 413	29 413	29 413	29 413	29 413	Shut down
UK/2*	89 872	89 000	89 872	89 872	89 872	89 872	89 872	74 855
UK/3*	737 000	738 000	738 000	738 000	738 000	738 000	738 000	738 000
Total	**855 872**	**856 000**	**857 285**	**857 285**	**857 285**	**857 285**	**857 285**	**812 855**

Production capacity of all installations in the Convention area

	1998	1999	2000	2001	2002	2003	2004	2005
tonnes	6 170 314	5 784 810	5 441 320	5 214 279	4 947 861	4 786 984	4 764 067	4 660 910
%	100	93,8	88,2	84,5	80,2	77,6	77,2	75,5

Production capacity of installations in the drainage area to the maritime area

	1998	1999	2000	2001	2002	2003	2004	2005
tonnes	3 819 424	3 810 540	3 805 143	3 744 906	3 476 003	3 315 126	3 292 209	3 215 551
%	100	99,8	99,6	98,0	91,0	86,8	86,2	84,2

[2] 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).

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

Site	1998	1999	2000	2001	2002	2003	2004	2005
Belgium								
B/1	NI	173	157	122	82	92	142	88
B/2	NI	178	180	175	169	186	178	179
B/3	NI	113	111	88	78	85	82	60
B/4	NI	173	201	120				
Total	**893**	**637**	**649**	**505**	**329**	**363**	**402**	**327**
Finland								
SF/1	NI	63	43	41	44	37	56	59
Total	**NI**	**63**	**43**	**41**	**44**	**37**	**56**	**59**
France								
F/1	NI	28	29	24	15	12	25	21
F/2	NI	129	119	121	92	118	116	125
F/3	NI	345	338	226	216	245	189	202
F/4	NI	192	220	203	152	127	96	106
F/5	NI	32	32	33	34	33	32	29
F/6	NI	190	152	139	175	185	147	168
F/7	NI	281	243	237	202	282	242	290
Total	**1 149**	**1 197**	**1 133**	**983**	**886**	**1 002**	**847**	**941**
Germany								
D/1	NI	111	NA	NA	NA	NA	NA	NA
D/2	NI	147	247	159	127	128	103	94
D/3	NI	49	73	75	78	80	92	86
D/4	NI	367	367	358	285	NA	NA	NA
D/5	NI	261	166	162	157	169	173	169
D/6	NI	70	62	52	49	77	116	64
D/7	NI	313	257	199	218	289	260	194
D/8	NI	193	209	228	174	159	151	170
D/9	NI	161	165	197	199	213	244	243
D/10	NI	391	NA	NA	NA	NA	NA	NA
D/11	NI	104	18	NA	NA	NA	NA	NA
D/12	NI	132	137	NA	NA	NA	NA	NA
D/13	NI	137	171	201	163	146	141	153
D/14	285	100	112	80	67	64	62	56
D/15	NI	NA	NA	NA	NA	NA	NA	NA
Total	**2 864**	**2 536**	**1 982**	**1 711**	**1 517**	**1 325**	**1 343**	**1 229**
Netherlands								
NL/1	NI	71	68	57	41	45	42	46
NL/2	NI	196	NA	NA	NA	NA	NA	NA
Total	**282**	**267**	**68**	**57**	**41**	**45**	**42**	**46**
Portugal								
P/1	NI	130	121	100	NA	NA	NA	NA
P/2	NI	NA	NA	NA	NA	NA	NA	NA
Total	**202**	**130**	**121**	**100**	**NA**	**NA**	**NA**	**NA**
Spain								
E/1	NI	61	63	58	48	45	46	38
E/2	NI	30	29	25	16	NI	NI	NI
E/3	NI	66	57	52	38	42	32	30
E/4	NI	287	164	114	123	137	121	121
E/5	NI	142	102	101	86	74	92	47
E/6	NI	182	182	193	185	199	205	203
E/7	NI	53	49	32	36	30	26	25
E/8	NI	251	244	176	174	174	154	139
E/9	123	175	95	103	132	99	94	109
Total	**1 057**	**1 247**	**985**	**854**	**838**	**800**	**770**	**713**
Sweden								
S/1	NI	27	28	29	26	22	25	14
S/2	NI	18	19	18	17	19	22	20
Total	**65**	**45**	**47**	**47**	**43**	**41**	**47**	**34**

Site	1998	1999	2000	2001	2002	2003	2004	2005
Switzerland								
CH/1	NI	82	70	64	73	67	39	NA
CH/2	NI	19	20	28	19	19	11	NI
CH/3	NI	15	19	25	17	12	22	30
Total	**111**	**116**	**109**	**117**	**109**	**98**	**72**	**30**
UK								
UK/1	NI	15	16	17	18	35	54	Shut down
UK/2	NI	125	144	157	175	144	154	112
UK/3	NI	1 476	1 535	1 439	1 188	1 237	1 155	1 183
Total	**1 493**	**1 616**	**1 695**	**1 613**	**1 381**	**1 416**	**1 363**	**1 295**

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

	1998	1999	2000	2001	2002	2003	2004	2005
kg/year	8 179	7 854	6 832	6 028	5 188	4 933	4 730	4 450
%	100	96,0	83,5	73,3	63,4	60,3	57,8	54,4

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

Site	1998	1999	2000	2001	2002	2003	2004	2005
Belgium								
B/1	NI	0,750	0,715	0,556	0,374	0,419	0,649	0,400
B/2	NI	0,710	0,720	0,699	0,676	0,744	0,712	0,718
B/3	NI	1,125	0,921	0,736	0,647	0,712	0,684	0,503
B/4	NI	2,110	2,212	2,890	NA	NA	NA	NA
Finland								
SF/1	NI	1,574	1,078	1,026	1,046	0,878	1,324	1,380
France								
F/1	NI	1,580	1,631	1,317	0,819	0,646	1,400	1,149
F/2	NI	1,792	1,646	1,680	1,277	1,644	1,615	1,732
F/3	NI	1,431	1,403	0,940	0,896	1,019	0,785	0,838
F/4	NI	1,131	1,292	1,197	0,896	0,746	0,567	0,621
F/5	NI	1,444	1,436	1,457	1,509	1,469	1,402	1,308
F/6	NI	1,144	0,917	0,836	1,054	1,117	0,883	1,015
F/7	NI	1,522	1,320	1,286	1,094	1,530	1,312	1,574
Germany								
D/1	NI	1,707	NA	NA	NA	NA	NA	NA
D/2	NI	1,128	1,766	1,132	1,153	1,163	0,934	0,724
D/3	NI	0,406	0,583	0,601	0,622	0,640	0,733	0,689
D/4	NI	1,223	1,223	1,193	1,862	NA	NA	NA
D/5	NI	1,740	1,040	1,010	0.980	1,060	1,083	1,020
D/6	NI	0,540	0,416	0,348	0,326	0,515	0,777	0,428
D/7	NI	1,740	1,410	1,130	1,240	1,640	1,479	1,101
D/8	NI	1,970	1,540	1,680	1,281	1,167	1,111	1,254
D/9	NI	1,070	1,032	1,182	1,189	1,279	1,464	1,455
D/10	NI	1,576	NA	NA	NA	NA	NA	NA
D/11	NI	1,740	1,864	NA	NA	NA	NA	NA
D/12	NI	0,843	0,871	NA	NA	NA	NA	NA
D/13	NI	0,910	1,069	1,259	1,019	0,911	0,884	0,956
D/14	NI	1,390	1,364	0,966	0,815	0,776	0,757	0,680
D/15	NI	NA	NA	NA	NA	NA	NA	NA
Netherlands								
NL/1	NI	1,008	0,909	0,765	0,551	0,610	0,571	0,615
NL/2	NI	1,400	NA	NA	NA	NA	NA	NA
Portugal								
P/1	NI	2,700	2,800	2,300	NA	NA	NA	NA
P/2	NI	NA	NA	NA	NA	NA	NA	NA
Spain								
E/1	NI	2,040	2,020	1,861	1,545	1,430	1,461	1,204
E/2	NI	2,020	1,948	1,667	1,626	NI	NI	NI
E/3	NI	1,970	1,699	1,563	1,123	1,264	0,945	0,884
E/4	NI	1,910	1,094	0,762	0,821	0,911	0,811	0,806
E/5	NI	2,259	1,632	1,608	1,368	1,172	1,461	0,756
E/6	NI	0,870	0,834	0,885	0,848	0,914	0,944	0,933
E/7	NI	2,100	1,940	1,265	1,428	1,220	1,030	1,017
E/8	NI	1,860	1,810	1,300	1,290	1,290	1,140	1,030
E/9	NI	1,730	0,938	1,021	1,309	0,976	0,933	1,081
Sweden								
S/1	NI	0,268	0,278	0,288	0,258	0,221	0,248	0,186
S/2	NI	0,154	0,144	0,154	0,143	0,161	0,188	0,167

Site	1998	1999	2000	2001	2002	2003	2004	2005
Switzerland								
CH/1	NI	1,490	1,271	1,162	1,336	1,227	1,227	NA
CH/2	NI	0,877	0,743	1,054	0,699	0,712	0,429	NI
CH/3	NI	0,560	0,692	0,917	0,638	0,434	0,802	1,110
UK								
UK/1	NI	0,525	0,538	0,574	0,606	1,180	1,852	Shut down
UK/2	NI	1,410	1,600	1,744	1,950	1,600	1,710	1,494
UK/3	NI	2,000	2,080	1,950	1,610	1,677	1,565	1,603

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

Site	1998	1999	2000	2001	2002	2003	2004	2005
Belgium								
B/1	290	156	137	106	68	74	120	67
B/2	176	154	157	153	153	164	160	164
B/3	146	101	98	74	63	62	64	49
B/4	160	146	172	80	NA	NA	NA	NA
Total	**772**	**558**	**564**	**413**	**284**	**300**	**344**	**280**
Finland								
SF/1	40	53	35	34	39	31	46	54
Total	**40**	**53**	**35**	**34**	**39**	**31**	**46**	**54**
France								
F/1	26	25	26	21	12	7	14	11
F/2	111	115	103	108	80	103	106	113
F/3	301	320	313	210	202	235	181	191
F/4	179	182	188	171	109	88	67	64
F/5	330	25	25	26	27	27	26	24
F/6	24	161	129	109	147	142	118	139
F/7	160	255	223	186	170	255	217	275
Total	**1 131**	**1 083**	**1 007**	**831**	**747**	**857**	**729**	**818**
Germany								
D/1	173	105	NA	NA	NA	NA	NA	NA
D/2	92	135	235	146	114	113	98	88
D/3	84	39	63	68	71	74	86	80
D/4	255	353	353	345	274	NA	NA	NA
D/5	256	255	160	155	150	163	167	162
D/6	105	66	58	48	45	72	111	59
D/7	128	301	244	187	206	276	247	181
D/8	280	175	171	179	141	113	114	142
D/9	150	149	151	185	188	203	233	232
D/10	354	382	NA	NA	NA	NA	NA	NA
D/11	105	100	18	NA	NA	NA	NA	NA
D/12	103	119	128	NA	NA	NA	NA	NA
D/13	97	124	158	177	144	135	131	142
D/14	285	96	110	74	65	62	60	54
D/15	238	NA	NA	NA	NA	NA	NA	NA
Total	**2 705**	**2 399**	**1 849**	**1 564**	**1 398**	**1 211**	**1 248**	**1 140**
Netherlands								
NL/1	65	65	65	53	37	42	40	42
NL/2	180	178	NA	NA	NA	NA	NA	NA
Total	**245**	**243**	**65**	**53**	**37**	**42**	**40**	**42**
Portugal								
P/1	92	91	82	69	NA	NA	NA	NA
P/2	28	NA	NA	NA	NA	NA	NA	NA
Total	**120**	**91**	**82**	**69**	**NA**	**NA**	**NA**	**NA**
Spain								
E/1	31	38	45	36	33	38	40	32
E/2	21	20	19	17	12	NI	NI	NI
E/3	66	51	43	32	23	31	23	21
E/4	210	218	118	69	80	114	105	101
E/5	109	91	85	91	77	63	74	38
E/6	126	157	165	178	171	182	193	188
E/7	48	35	27	22	28	26	22	22
E/8	203	227	204	155	148	151	128	117
E/9	123	152	74	84	112	81	85	93
Total	**937**	**989**	**780**	**684**	**684**	**686**	**670**	**613**
Sweden								
S/1	37	25	25	27	23	20	23	13
S/2	21	17	17	17	15	16	20	18
Total	**58**	**42**	**42**	**44**	**38**	**36**	**43**	**31**

Site	1998	1999	2000	2001	2002	2003	2004	2005
Switzerland								
CH/1	57	75	63	58	69	65	38	NA
CH/2	18	19	19	27	18	18	11	NI
CH/3	21	10	14	17	14	8	17	22
Total	**96**	**104**	**96**	**102**	**101**	**91**	**66**	**22**
UK								
UK/1	14	14	14	13	13	29	49	Shut down
UK/2	106	117	137	149	169	137	147	108
UK/3	1 107	1 292	1 269	1 270	1 048	1 053	1 010	958
Total	**1 227**	**1 423**	**1 420**	**1 432**	**1 230**	**1 219**	**1 206**	**1 066**

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

	1998	1999	2000	2001	2002	2003	2004	2005
kg/year	7 331	6 985	5 940	5 226	4 558	4 475	4 392	4 066
%	100	95,3	81,0	71,3	62,2	61	59,9	55,5

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

Site	1998	1999	2000	2001	2002	2003	2004	2005
Belgium								
B/1	1,320	0,680	0,627	0,484	0,310	0,338	0,547	0,307
B/2	0,705	0,617	0,627	0,615	0,611	0,657	0,641	0,654
B/3	1,213	1,013	0,813	0,615	0,524	0,516	0,531	0,411
B/4	1,770	1,780	1,888	1,930	NA	NA	NA	NA
Finland								
SF/1	1,000	1,322	0,885	0,856	0,916	0,738	1,084	1,27
France								
F/1	1,390	1,380	1,442	1,154	0,651	0,416	0,763	0,618
F/2	1,540	1,600	1,424	1,498	1,111	1,433	1,469	1,570
F/3	1,250	1,330	1,300	0,871	0,838	0,976	0,752	0,792
F/4	1,050	1,068	1,108	1,004	0,641	0,518	0,396	0,375
F/5	1,790	1,123	1,132	1,159	1,199	1,186	1,153	1,087
F/6	1,080	0,971	0,776	0,660	0,886	0,853	0,712	0,840
F/7	0,960	1,381	1,210	1,011	0,921	1,384	1,176	1,494
Germany								
D/1	1,330	1,610	NA	NA	NA	NA	NA	NA
D/2	0,710	1,040	1,680	1,040	1,040	1,030	0,890	0,680
D/3	0,700	0,322	0,507	0,546	0,571	0,592	0,687	0,639
D/4	1,700	1,175	1,175	1,150	1,792	NA	NA	NA
D/5	1,420	1,700	1,000	0,970	0,940	1,020	1,043	0,980
D/6	1,609	0,510	0,390	0,322	0,303	0,481	0,745	0,396
D/7	0,800	1,670	1,340	1,060	1,170	1,570	1,405	1,030
D/8	1,400	1,790	1,260	1,320	1,039	0,834	0,842	1,042
D/9	1,000	0,995	0,942	1,106	1,125	1,215	1,396	1,387
D/10	1,180	1,540	NA	NA	NA	NA	NA	NA
D/11	2,100	1,660	1,846	NA	NA	NA	NA	NA
D/12	1,431	0,760	0,815	NA	NA	NA	NA	NA
D/13	0,620	0,829	0,989	1,108	0,898	0,841	0,820	0,890
D/14	0,950	1,330	1,330	0,900	0,787	0,756	0,734	0,653
D/15	1,980	NA	NA	NA	NA	NA	NA	NA
Netherlands								
NL/1	0,920	0,927	0,873	0,716	0,501	0,560	0,542	0,559
NL/2	1,230	1,270	NA	NA	NA	NA	NA	NA
Portugal								
P/1	1,893	1,900	1,900	1,600	NA	NA	NA	NA
P/2	1,061	NA	NA	NA	NA	NA	NA	NA
Spain								
E/1	0,960	1,260	1,420	1,141	1,041	1,220	1,265	1,030
E/2	1,430	1,330	1,272	1,153	1,166	NI	NI	NI
E/3	1,960	1,510	1,280	0,959	0,685	0,927	0,690	0,627
E/4	1,400	1,450	0,784	0,462	0,537	0,760	0,699	0,674
E/5	1,735	1,442	1,347	1,455	1,226	1,001	1,178	0,603
E/6	0,603	0,750	0,758	0,818	0,784	0,836	0,885	0,863
E/7	1,900	1,400	1,060	0,880	1,120	1,040	0,880	0,890
E/8	1,500	1,680	1,510	1,140	1,100	1,120	0,950	0,870
E/9	1,220	1,500	0,735	0,831	1,110	0,800	0,843	0,925
Sweden								
S/1	0,370	0,250	0,250	0,270	0,234	0,204	0,231	0,173
S/2	0,171	0,139	0,131	0,140	0,121	0,135	0,167	0,151

Site	1998	1999	2000	2001	2002	2003	2004	2005
Switzerland								
CH/1	1,030	1,370	1,146	1,065	1,258	1,176	1,176	NA
CH/2	0,680	0,848	0,710	1,019	0,670	0,689	0,408	NA
CH/3	0,780	0,370	0,517	0,625	0,515	0,315	0,647	0,820
UK								
UK/1	0,483	0,470	0,461	0,452	0,438	1,004	1,669	Shut down
UK/2	1,179	1,310	1,520	1,660	1,880	1,520	1,640	1,446
UK/3	1,501	1,750	1,720	1,720	1,420	1,427	1,368	1,298

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

Site	1998	1999	2000	2001	2002	2003	2004	2005
Belgium								
B/1	NI	837	6 823	260	2 889	2 293	4 608	5 405
B/2	NI	5 733	3 566	4 646	358	NI	250	5 949
B/3	NI	3	5	6	67	6	5	3
B/4	NI	0	2	1 242	NA	NA	NA	NA
Total	**8 529**	**6 573**	**10 396**	**6 154**	**3 254**	**2 299**	**4 863**	**11 357**
Finland								
SF/1	0	0	0,16	0	0	0	0	0
Total	**0**	**0**	**0,16**	**0**	**0**	**0**	**0**	**0**
France								
F/1	NI	0	0	0	18	33	75	17
F/2	NI	68	2 632	9 644	8 896	6 230	7 268	7 309
F/3	NI	1 257	1 296	1 078	922	1 323	1 143	1 423
F/4	NI	54	37	43	41	34	26	34
F/5	NI	0	70	6	238	13	3	NI
F/6	NI	33	16	64	48	25	15	9
F/7	NI	24	35	8	25	24	44	32
Total	**344**	**1 436**	**4 086**	**10 843**	**10 188**	**7 682**	**8 574**	**8 824**
Germany								
D/1	NI	31	NA	NA	NA	NA	NA	NA
D/2	NI	4	0	NI	NI	NI	138	182
D/3	NI	2	3	2	1	NI	NI	NI
D/4	NI	3 054	3 054	1 259	3 437	NA	NA	NA
D/5	NI	66	576	766	5 799	10 555	10 027	4 958
D/6	NI	1 314	3 764	1034	472	1 591	1 551	496
D/7	NI	37 260	20 602	13 200	13 390	12 260	16 490	15 330
D/8	NI	1 646	2 311	NI	674	2 282	1 536	356
D/9	NI	2 270	4 570	4 230	6 366	5 340	4 355	3 239
D/10	NI	304	NA	NA	NA	NA	NA	NA
D/11	NI	19	NI	NA	NA	NA	NA	NA
D/12	NI	176	176	NA	NA	NA	NA	NA
D/13	NI	2 692	5 659	9 209	4 378	2 745	2 500	2 780
D/14	NI	1 656	754	833	406	85	212	71
D/15	NI	NA	NA	NA	NA	NA	NA	NA
Total	**26 200**	**50 494**	**41 469**	**30 533**	**34 923**	**34 858**	**36 808**	**27 412**
Netherlands								
NL/1	NI	6	2	28	7	3	2	1
NL/2	NI	0	NA	NA	NA	NA	NA	NA
Total	**38**	**6**	**2**	**28**	**7**	**3**	**2**	**1**
Portugal								
P/1	NI	0	0	0	NA	NA	NA	NA
P/2	NI	NA	NA	NA	NA	NA	NA	NA
Total	**689**	**0**	**0**	**0**	**0**	**0**	**0**	
Spain								
E/1	NI	1 265	4 276	495	2 027	846	408	1 297
E/2	NI	27	8	9	141	NI	NI	NI
E/3	NI	384	599	359	472	679	402	323
E/4	NI	2 694	6 279	4 868	2 343	2 020	2 837	3 549
E/5	NI	1 013	412	59	0	440	1 544	1 880
E/6	NI	604	770	1 088	2 339	2 625	622	900
E/7	NI	20	10	3	13	14	NI	315
E/8	NI	498	432	459	552	328	506	633
E/9	NI	500	401	279	169	349	185	217
Total	**657**	**7 005**	**13 187**	**7 619**	**8 056**	**7 301**	**6 503**	**9 114**
Sweden								
S/1	NI	6	6	850	5	NI	55	NI

* 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
S/2	NI	1	1	1	NI	NI	NI	NI
Total	**42**	**7**	**7**	**851**	**5**	**NI**	**55**	**NI**
Switzerland								
CH/1	NI	165	178	215	207	239	139	NA
CH/2	NI	0	3	32	1	2	1	NI
CH/3	NI	1 084	0	1 933	NI	1 891	NI	1 859
Total	**1 905**	**1 249**	**181**	**2 180**	**208**	**2 132**	**140**	**1 859**
UK								
UK/1	NI	161	268	263	136	118	246	Shut down
UK/2	NI	37	48	147	113	119	134	43
UK/3	NI	3 911	3 092	2 842	10 745	21 247	6 208	6 446
Total	**3 187**	**4 109**	**3 408**	**3 252**	**10 994**	**21 484**	**6 588**	**6 489**

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

Site	1998	1999	2000	2001	2002	2003	2004	2005
Belgium								
B/1	NI	3,640	31,155	1,188	13,192	10,472	21,041	24,680
B/2	NI	22,930	14,264	18,585	1,432	NI	1,000	23,794
B/3	NI	0,025	0,039	0,046	0,055	0,047	0,038	0,029
B/4	NI	0	0,0260	29,819	NA	NA	NA	NA
Finland								
SF/1	NI	0,003	0,004	0,006	0,003	NI	NI	NI
France								
F/1	NI	0	0	0	1,024	1,810	4,130	0,953
F/2	NI	0,950	36,560	133,941	123,555	86,528	100,950	101,514
F/3	NI	5,220	5,380	4,474	3,828	5,491	4,746	5,907
F/4	NI	0,320	0,215	0,255	0,240	0,200	0,155	0,202
F/5	NI	0	3,100	0,280	10,580	0,600	0,140	NI
F/6	NI	0,196	0,094	0,386	0,292	0,148	0,092	0,052
F/7	NI	0,131	0,190	0,044	0,134	0,131	0,237	0,172
Germany								
D/1	NI	0,480	NA	NA	NA	NA	NA	NA
D/2	NI	0,030	0	0	NI	NI	1,250	1,400
D/3	NI	0,014	0,021	0,014	0,007	NI	NI	NI
D/4	NI	10,180	10,180	4,197	22,464	NA	NA	NA
D/5	NI	0,440	3,600	4,788	36,242	66	62,670	29,960
D/6	NI	10,104	25,290	6,950	3,171	11	10,422	3,330
D/7	NI	207,000	113,200	75,000	76,080	70	93,693	87,102
D/8	NI	16,800	17,000	0	4,959	17	11,295	2,621
D/9	NI	15,134	28,560	25,329	38,119	32	26,077	19,398
D/10	NI	1,225	NA	NA	NA	NA	NA	NA
D/11	NI	0,310	0	NA	NA	NA	NA	NA
D/12	NI	1,120	1,120	NA	NA	NA	NA	NA
D/13	NI	17,949	35,371	57,555	27,362	17	15,628	17,378
D/14	NI	23,000	9,150	10,110	4,937	1	2,571	0,857
D/15	NI	NA	NA	NA	NA	NA	NA	NA
Netherlands								
NL/1	NI	0,082	0,027	0,382	0,100	0,043	0,029	0,008
NL/2	NI	0	NA	NA	NA	NA	NA	NA
Portugal								
P/1	NI	0	0	0	NA	NA	NA	NA
P/2	NI	NA	NA	NA	NA	NA	NA	NA
Spain								
E/1	NI	42,150	136,300	15,759	64,604	27	12,995	41,354
E/2	NI	1,800	0,556	0,607	14,300	NI	NI	NI
E/3	NI	11,460	17,850	10,703	14,056	20	11,977	9,624
E/4	NI	17,960	41,860	32,450	15,620	13	18,910	23,662
E/5	NI	16,085	6,564	0,943	0,005	7	24,606	29,962
E/6	NI	2,890	3,533	4,994	10,737	12	2,857	4,129
E/7	NI	0,800	0,380	0,120	0,528	1	NI	12,600
E/8	NI	3,690	3,200	3,400	4,090	2	3,750	4,690
E/9	NI	4,950	3,970	2,767	1,673	3	1,830	2,150
Sweden								
S/1	NI	0,064	0,064	8,500	0,052	NI	0,553	NI
S/2	NI	0,011	0,010	0,010	NI	NI	NI	NI

* 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
Switzerland								
CH/1	NI	3,000	3,230	3,900	3,774	4,350	4,350	NA
CH/2	NI	0	0,104	1,216	0,021	0,061	0,030	NI
CH/3	NI	40,910	0	71,602	NI	70,048	NI	68,835
UK								
UK/1	NI	5,540	9,115	8,938	4,631	4,001	8,359	Shut down
UK/2	NI	0,420	0,530	1,640	1,260	1,330	1,490	0,573
UK/3	NI	5,300	4,190	3,850	14,560	28,790	8,412	8,734

4. 2005 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 the current formats:

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 two following maps give an overview of the locations of the mercury-based chlor-alkali plants indicated below and their operators:

Country/Code	Company	Location	Status
Belgium			
B/1	Solvin	Lillo	
B/2	Tessenderlo	Tessenderlo	
B/3	Solvin	Antwerpen	
B/4	Solvay	Jemeppe	Replaced its mercury technology in 2001
Finland			
SF/1	Eka Chemicals	Oulu	The permitted discharges and emissions have been increased on the basis of a revised authorisation in 2002
France			
F/1	PC de Loos	Loos	
F/2	Albemarle PPC	Thann	
F/3	Solvay	Tavaux	
F/4	Arkema	Jarrie	
F/5	SPC Harbonnières	Harbonnières	
F/6	Arkema	Lavera	
F/7	Arkema	St Auban	
Germany [3]			
D/1	ECI	Bitterfeld	Ceased operation in 1999
D/2	Bayer	Uerdingen	Converted to membrane
D/3	Akzo Nobel	Ibbenbüren	
D/4	Bayer	Leverkusen	Shut down in 2002
D/5	BASF	Ludwigshafen	
D/6	Ineos	Wilhelmshafen	
D/7	Vestolit	Marl	Shut down of some cells in 2001
D/8	Degussa - Hüls	Lülsdorf	
D/9	Lil	Frankfurt	The permitted discharges and emissions have been increased on the basis of a revised authorisation in 2001
D/10	Bayer	Dormagen	Ceased operation in 1999
D/11	Clariant	Gersthofen	Shut down in 2000
D/12	Wacker Chemie	Burghausen	Shut down in 2000
D/13	Vinnolit	Knapsack	
D/14	Vinnolit	Gendorf	
D/15	BSL Olefinverbund	Schkopau	Shut down in 1998
The Netherlands			
NL/1	Akzo Nobel	Hengelo	
NL/2	Solvay	Linne-Herten	Decommissioned in 1999
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

[3] Germany advised that 7 plants have been converted. 5 more plants are to be converted.

Country/Code	Company	Location	Status
Spain			
E/1	Quimica del Cinca	Monzon	
E/2	Electroquimica de Hernani	Hernani	Partly converted to membrane technology
E/3	Elnosa	Lourizan	
E/4	Ercros	Flix	
E/5	Solvay	Torrelavega	
E/6	Solvin	Martorell	
E/7	Aragonesas	Sabinanigo	
E/8	Aragonesas	Vilaseca	
E/9	Aragonesas	Huelva/Palos	
Sweden			
S/1	Akzo Nobel	Bohus	
S/2	Hydro Polymers	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	
UK/3	Ineos	Runcorn	

4.3 Other OSPAR Contracting Parties

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.

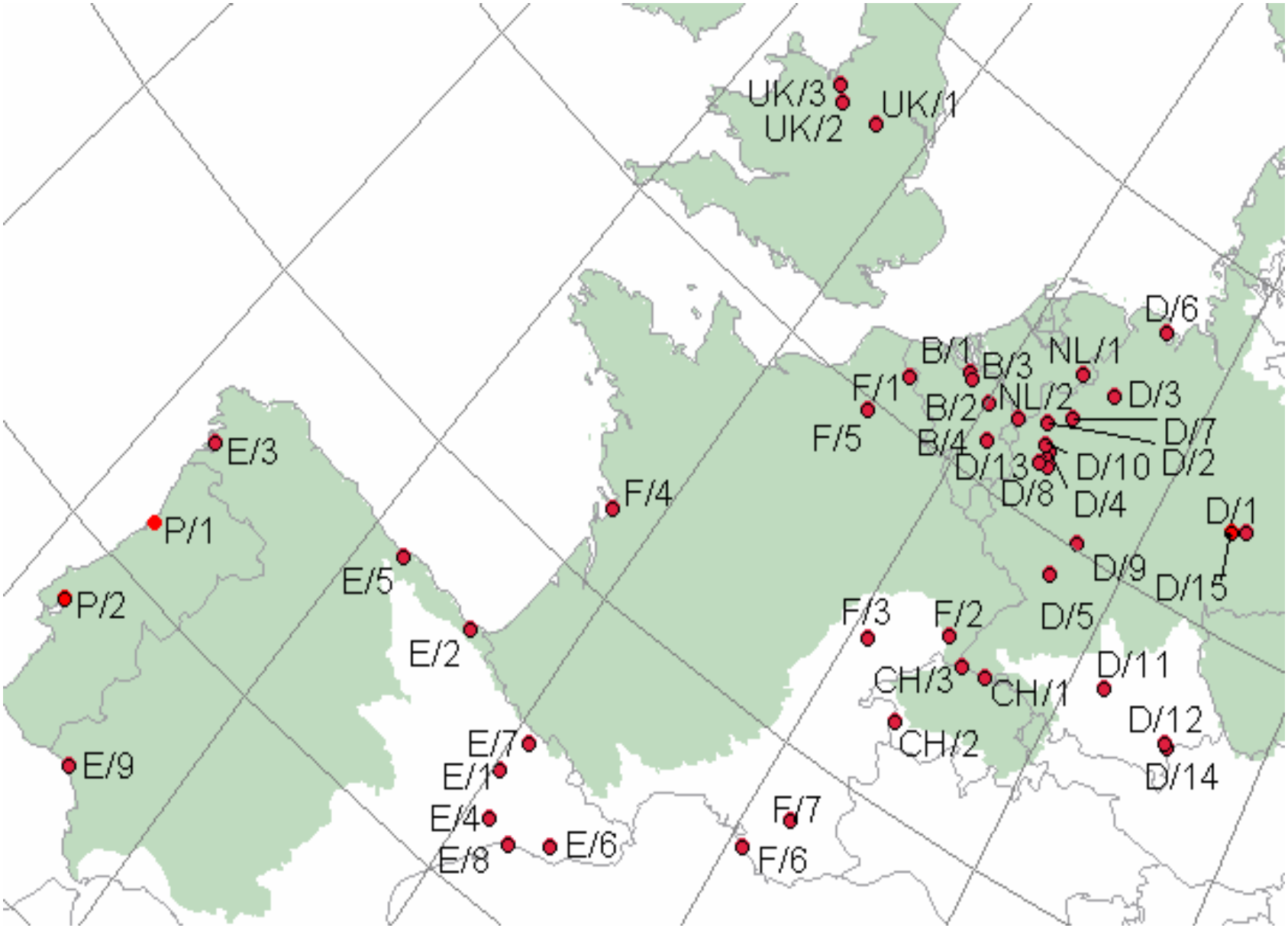
Luxembourg

Luxembourg has no chlor-alkali plants.

Norway

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


SF/1
S/2
S/1


UK/3
UK/2
UK/1
D/6
B/1
B/3
NL/1
F/1
D/3
B/2
NL/2
F/5
D/7
B/4
D/13
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D/9
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D/15
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D/11
CH/3
CH/1
D/12
CH/2
E/7
E/9
E/1
D/14
E/4
F/7
E/8
E/6
F/6

Belgium

Site	Chlorine Production Capacity with Hg-cells (tonnes)	Sea Area	Brine W or R	Mercury consumption C (g/t)	Losses via Products E1 (g/t)	Discharges via Waste Water E2 (g/t)	Emissions to the Atmosphere			Total Emissions Discharges Losses (g/t)	Mercury in Wastes					Difference to Balance DB (g/t)
							Process Exhaust 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
B/1	219 000	A	R	50,580	0,058	0,035	0,081	0,226	0,307	0,400	24,680	-0,727			-3,320	28,820
B/2	250 000	A	R	13,600	0,056	0,008	0,003	0,651	0,654	0,718	23,794	-0,410	-2,318		-10,912	0,000
B/3	120 000	A	R	25,142	0,034	0,058	0,011	0,400	0,411	0,503	0,029					24,610
Total	**589 000**															

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 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
SF/1	42 485	Baltic	R	71,790	0,030	0,080	0,005	1,265	1,270	1,380		3,080			72,496	-2,086
Total	**42 485**															

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 (tonnes)	Sea Area	Brine W or R	Mercury consumption C (g/t)	Losses via Products E1 (g/t)	Discharges via Waste Water E2 (g/t)	Emissions to the Atmosphere			Total Emissions Discharges Losses (g/t)	Mercury in Wastes					Difference to Balance DB (g/t)
							Process Exhaust 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
F/1	18 040	A	R	11,641	0,028	0,503	0,012	0,606	0,618	1,149	0,953	-0,640			-35,477	45,016
F/2	72 000	A	R	145,764	0,123	0,039		1,570	1,570	1,732	101,514	1,416	1,463		39,986	2,532
F/3	240 900	M	R	8,601	0,043	0,003	0,010	0,782	0,792	0,838	5,907	0,327			1,357	0,499
F/4	170 070	M	R	7,291	0,057	0,189	0,016	0,359	0,375	0,621	0,202	0,024			0,141	6,328
F/5	22 500	A	R	15,333	0,219	0,002	0,001	1,086	1,087	1,308		0,048			2,133	11,892
F/6	166 000	M	R	10,723	0,034	0,141		0,840	0,840	1,015	0,052					9,656
F/7	184 300	M	R	7,341	0,019	0,061	0,001	1,493	1,494	1,574	0,172	-0,801			-4,346	9,941
Total	**873 810**															

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 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)	
D/2	130 000	A	R	19,992	0,040	0,004	0,030	0,650	0,680	0,724	1,400	0,300	0,040		2,615	15,253
D/3	125 000	A	R		0,048	0,001	0,013	0,626	0,639	0,688		0,454			3,635	-4,324
D/5	165 500	A	R	-64,169	0,030	0,010		0,98	0,980	1,020	29,960	3,600		-5,480	-11,360	-83,790
D/6	148 828	A	R	6,161	0,023	0,010		0,396	0,396	0,429	3,330	0,185	-0,085	0,241	2,291	0,113
D/7	176 000	A	R	78,977	0,060	0,011	0,024	1,006	1,030	1,101	87,102		-5,560		-31,591	22,365
D/8	135 951	A	R	18,808	0,175	0,037	0,043	0,999	1,042	1,254	2,621	2,042	-0,540	-3,230	-12,708	27,642
D/9	167 000	A	R	5,988	0,061	0,007	0,086	1,301	1,387	1,455	19,398			-1,957	-11,719	-3,146
D/13	160 000	A	R	106,838	0,059	0,007	0,018	0,872	0,890	0,956	17,378	10,181			63,631	24,872
D/14	82 355	Bl Sea	R	133,568	0,026	0,001	0,033	0,620	0,653	0,680	0,857	6,410	0,002		77,858	54,173
Total	**1 290 634**															

The Netherlands

Site	Chlorine Production Capacity with Hg-cells (tonnes)	Sea Area	Brine W or R	Mercury consumption C (g/t)	Losses via Products E1 (g/t)	Discharges via Waste Water E2 (g/t)	Emissions to the Atmosphere			Total Emissions Discharges Losses (g/t)	Mercury in Wastes					Difference to Balance DB (g/t)
							Process Exhaust 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
NL/1	74 294	A	R	8,816	0,017	0,039	0,126	0,433	0,559	0,615	0,008	0,549			7,385	0,809
Total	**74 294**															

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 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)	
E/1	31 373	M	R	22,695	0,157	0,017	0,004	1,026	1,030	1,204	41,354		-0,429		-13,674	-6,189
E/3	33 552	A	R	12,607	0,243	0,014	0,115	0,512	0,627	0,884	9,624		0,017		0,507	1,593
E/4	150 000	M	R	18,667	0,076	0,056	0,005	0,669	0,674	0,806	23,662	-1,418	0,072		-8,973	3,172
E/5	62 747	A	W	42,759	0,121	0,032	0,018	0,585	0,603	0,756	29,962	0,594	-0,141		7,219	4,822
E/6	217 871	M	R	20,838	0,063	0,007	0,197	0,666	0,863	0,933	4,129			0,680	3,119	12,657
E/7	25 000	M	R	18,800	0,120	0,007	0,010	0,880	0,890	1,017	12,600	0,348	-0,279		2,760	2,423
E/8	135 004	M	R	24,014	0,110	0,050	0,010	0,860	0,870	1,030	4,690	1,187			8,792	9,502
E/9	100 929	A	R	15,070	0,137	0,020	0,360	0,565	0,925	1,082	2,150	0,550	-0,076		4,694	7,144
Total	**756 476**															

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 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
S/1	74 355	A	R	10,759	0,010	0,003	0,001	0,172	0,173	0,186		0,225	-0,007		2,932	7,641
S/2	120 000	A	R	12,925	0,014	0,003		0,151	0,151	0,167		-0,261			-2,175	14,933
Total	**194 355**															

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 2.3.1 (g/t)	Cellroom 2.3.2 (g/t)	Total E3 (g/t)		Disposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
CH/1*																
CH/2																
CH/3	27 000	A	R	35,186	0,252	0,038		0,820	0,820	1,110	68,835		-0,939		-34,760	
Total	**27 000**															

* 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).

** The Syngenta chlorine production unit located in Monthey (CH/2) was shut down in January 2005.

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	
	(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)
UK/2	74 855	A	R	143,437	0,035	0,013	0,009	1,437	1,446	1,494	0,573	-13,115			-175,205	316,576
UK/3	738 000	A	W	7,149	0,056	0,249	0,171	1,127	1,298	1,603	8,734	5,839			7,912	-11,100
Total	812 855															