OSPAR COMMISSION

Mercury losses from the Chlor-alkali industry, 2008

Hazardous Substances Series

2010

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. 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.

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. 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.

Contents

Executive summary

For most plants, losses of mercury from the chlor-alkali industry have continued to decrease. All plants had complied with the limit value of 2 g Hg/t Cl2 for air emissions. The amount of safe deposited waste was high in some cases, but this was possibly due to plants closing down. The assessment in 2010/2011 would provide an opportunity to better investigate these phenomena.

Récapitulatif

Pour la plupart des usines, les pertes de mercure de l'industrie de l'électrolyse des chlorures alcalins ont continué de diminuer. Toutes les usines ont respecté la valeur limite de 2 g Hg/t Cl2 pour les émissions atmosphériques. La quantité de déchets déposés dans des conditions de sécurité est élevée dans certains cas, mais cela est peut-être dû à la fermeture des usines. L'évaluation dans le cours de l'intersession 2010/2011 donnera l'occasion de mieux étudier ces phénomènes.

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 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.

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 Hazardous Substances Committee (HSC) of the OSPAR Commission adopted in 2003 the current reporting formats and procedures (see 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 HSC, the data are published by the Commission in form of Annual Reports on Mercury Losses from the Chlor-alkali Industry. This report series comprises yearly data series from 1982. The data are assessed by an expert assessment panel every two years.

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

This report continues the series of annual reports on discharges, emissions and losses of mercury by all routes from mercury-cell chlor-alkali plants. The report presents the 2008 data on production capacities, atmospheric emissions of mercury, and the amount of mercury in safely deposited wastes. The presentation of these figures since 1998 will also assist in the assessment of the effectiveness of the implementation of PARCOM Decision 90/3.

2. Assessment of the reports on mercury losses from the chlor-alkali industry in 2008

The 2008 data will be assessed together with the 2009 data and will be published in 2011.

3. Evolution of mercury losses from the chlor-alkali industry (1982 - 2008)

The following figures give a rough indication of the evolution of mercury losses from the chlor-alkali industry in the period 1982-2008 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 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.

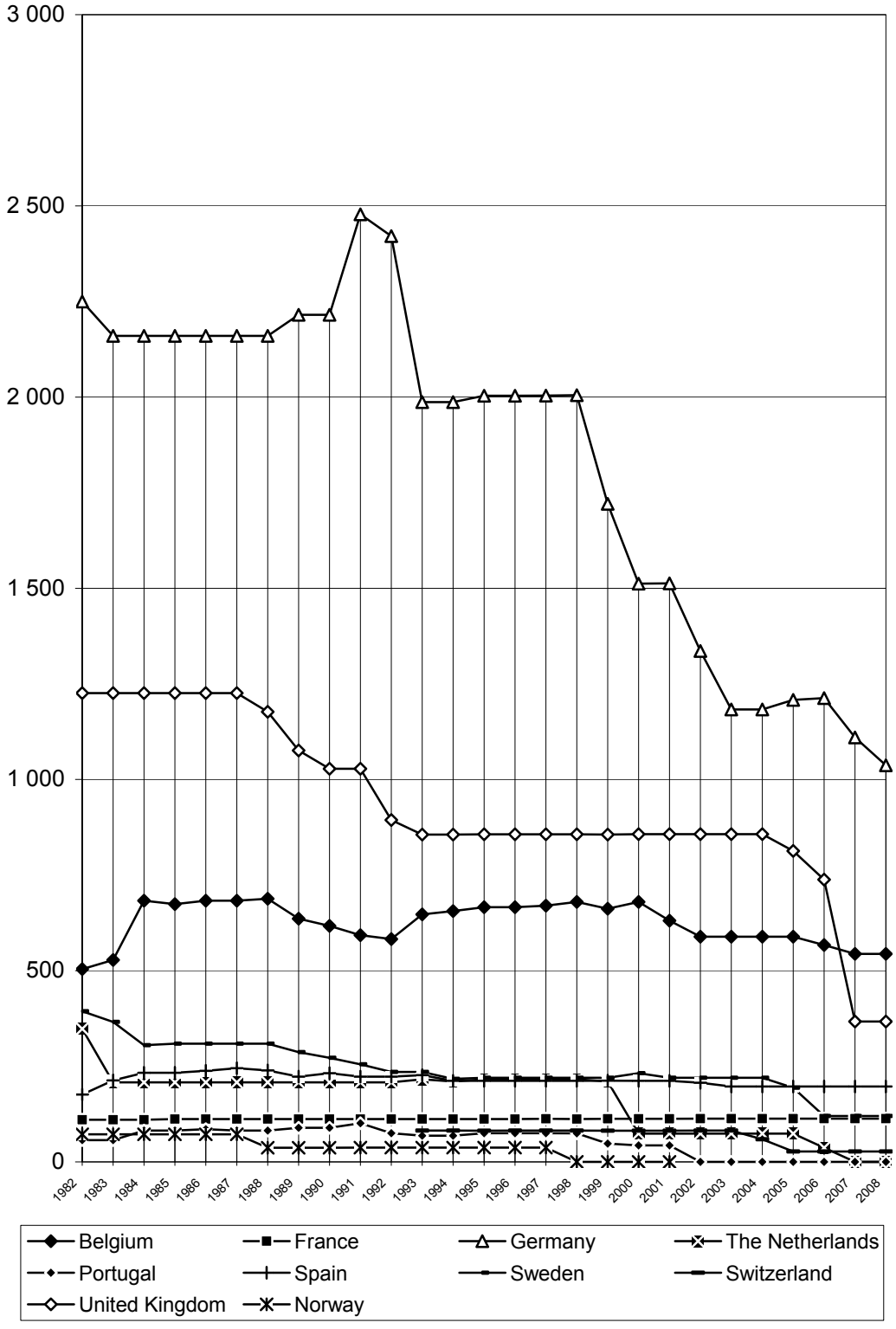

Figure 1a: Chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area by Contracting Party (in kilotonnes per year)

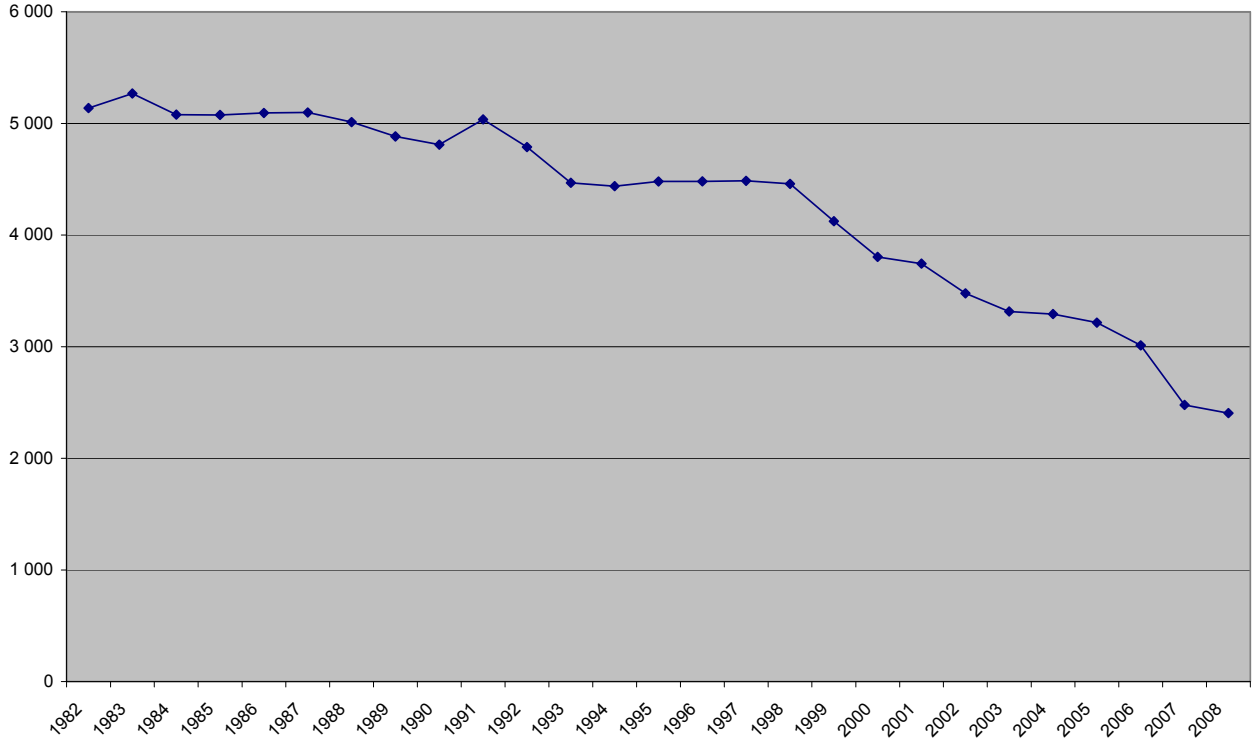

Figure 1b: Total chlorine production capacity with mercury cells of plants discharging into the OSPAR catchment area for all Contracting Parties (in kilotonnes per year)

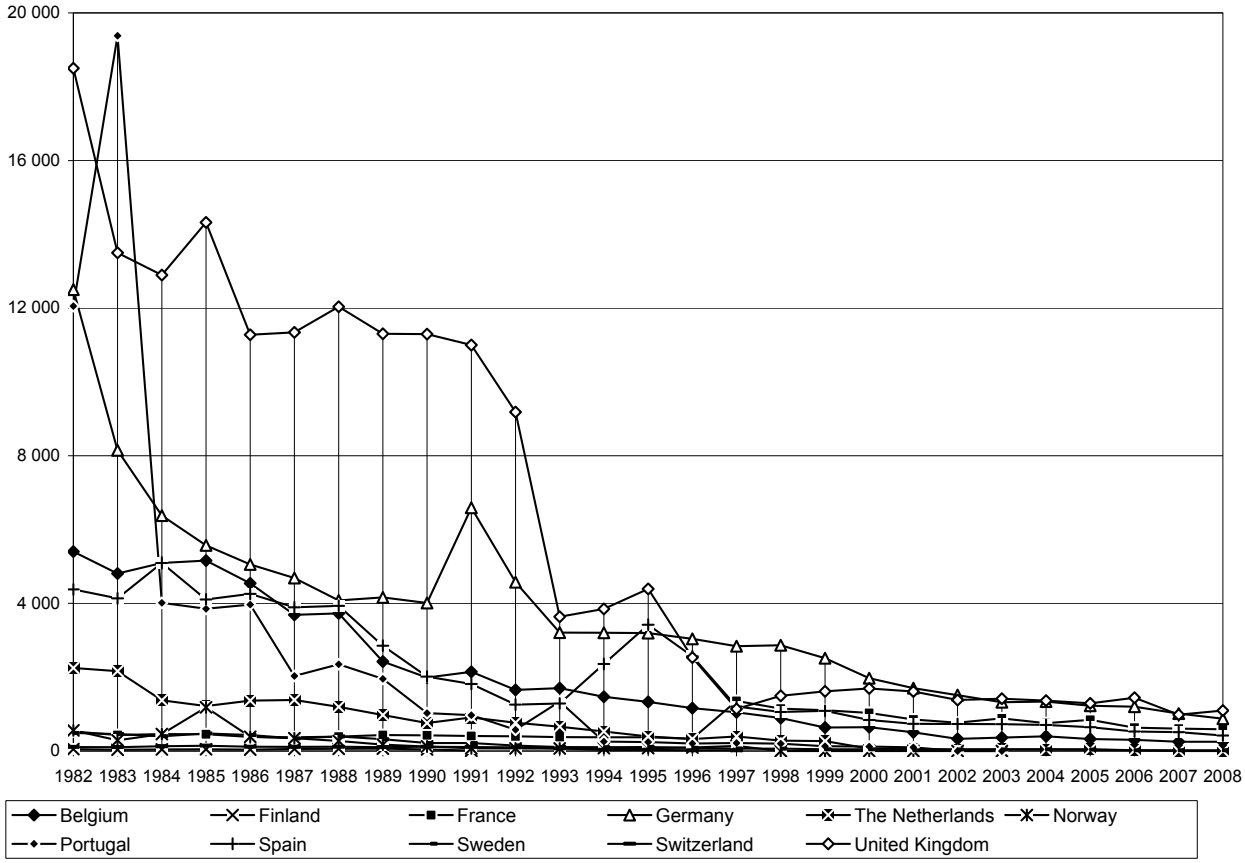

Figure 2a: Mercury losses through product, wastewater and air (in kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants)

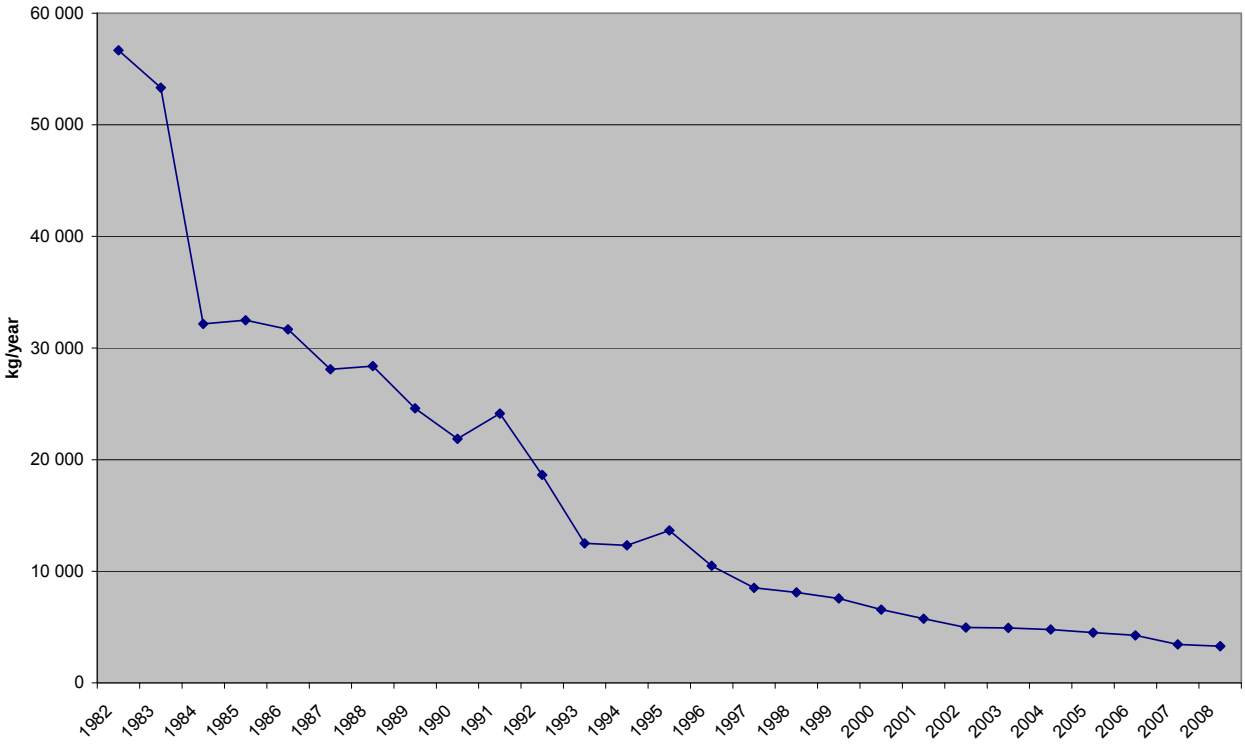

Figure 2b: Total mercury losses through product, wastewater and air for all Contracting Parties (in kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants)

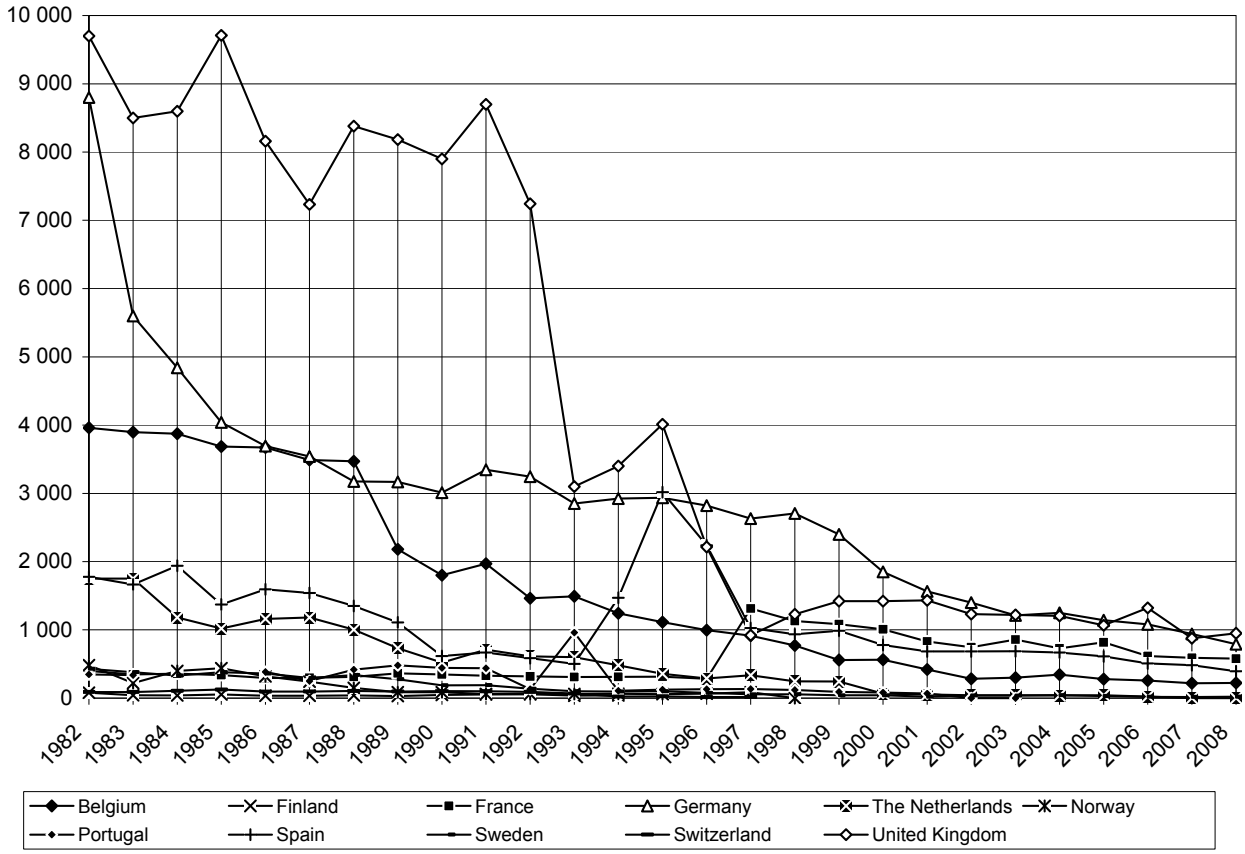

Figure 3a: Atmospheric emissions of mercury from all plants from Contracting Parties (in kilograms per year, all plants)

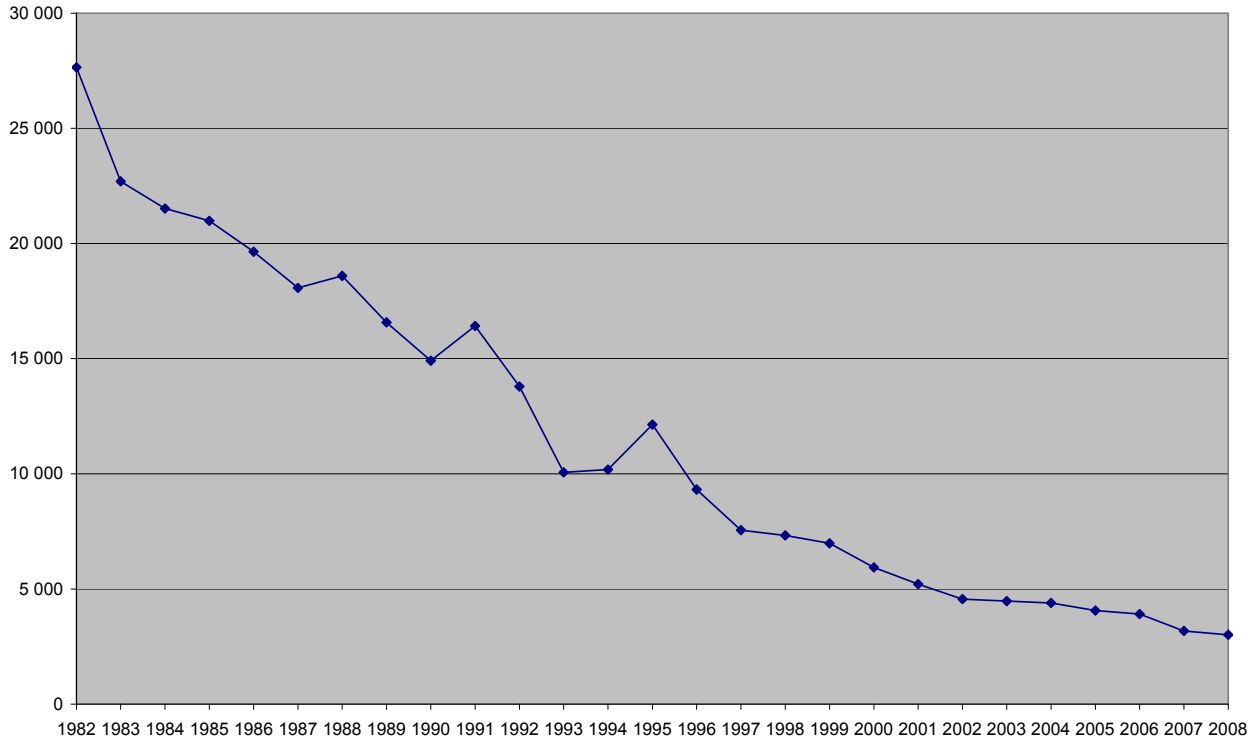

Figure 3b: Total atmospheric emissions of mercury from all plants for all Contracting Parties (in kilograms per year, all plants)

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
Belgium											
BE/1*	219 000	230 000	219 000	219 000	219 000	219 000	219 000	219 000	219 000	219 000	219 000
BE/2*	250 000	250 000	250 000	250 000	250 000	250 000	250 000	250 000	227 500	205 000	205 000
BE/3*	120 000	100 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000
BE/4*	90 900	82 000	90 900	41 663	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**679 900**	**662 000**	**679 900**	**630 663**	**589 000**	**589 000**	**589 000**	**589 000**	**566 500**	**544 000**	**544 000**
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
Total	**40 000**	**40 000**	**40 000**	**40 000**	**42 485**	**42 485**	**42 485**	**42 485**	**42 485**	**42 485**	**42 485**
France											
FR/1*	NI	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040	18 040
FR/2*	NI	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000	72 000
FR/3	NI	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900	240 900
FR/4	NI	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070	170 070
FR/5*	NI	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500
FR/6	NI	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000	166 000
FR/7	NI	184 300	184 300	184 300	184 300	184 300	184 300	184 300	Shutdown	Shutdown	Shutdown
Total	**NI**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**873 810**	**689 509**	**689 509**	**689 509**
Germany											
DE/1	130 000	65 000	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/2*	130 000	130 000	140 000	140 000	110 000	110 000	110 000	130 000	130 000	130 000	130 000
DE/3*	120 000	120 000	125 000	125 000	125 000	125 000	125 000	125 000	125 276	125 276	125 276
DE/4*	150 000	300 000	300 000	300 000	153 000	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/5*	180 000	150 000	160 000	160 000	160 000	160 000	160 000	165 500	170 000	170 000	170 000
DE/6*	65 000	130 000	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828	148 828
DE/7*	160 000	180 000	182 000	176 000	176 000	176 000	176 000	176 000	176 000	72 811	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
DE/9*	150 000	150 000	160 000	167 000	167 000	167 000	167 000	167 000	167 000	167 376	167 000
DE/10	300 000	248 000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	50 000	60 000	9 804	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/12	72 000	157 000	157 000	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/13*	157 000	150 000	160 000	160 000	160 000	160 000	160 000	160 000	160 000	160 000	160 000
DE/14	300 000	72 000	82 355	82 355	82 355	82 355	82 355	82 355	82 355	82 355	82 355
DE/15	120 000	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
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**	**1 295 411**	**1 192 597**	**1 119 410**
Netherlands											
NL/1*	70 000	70 000	74 294	74 294	74 294	74 294	74 294	74 294	37 452	Shutdown	Shutdown
NL/2*	140 000	140 000	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**210 000**	**210 000**	**74 294**	**74 294**	**74 294**	**74 294**	**74 294**	**74 294**	**37 452**	**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
P/2*	26 400	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
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
ES/2*	14 815	15 000	14 815	14 815	9 877	PC	PC	PC	PC	PC	PC

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
ES/3*	33 552	33 500	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552	33 552
ES/4	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000	150 000
ES/5*	62 745	63 000	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747	62 747
ES/6	209 200	209 000	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871	217 871
ES/7	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000
ES/8	135 000	135 000	135 004	135 004	135 004	135 004	135 004	135 004	135 004	135 004	135 004
ES/9*	101 000	101 000	100 929	100 929	100 929	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**	**756 475**	**756 475**	**756 475**
Sweden											
SE/1*	100 000	100 000	100 000	100 000	100 000	100 000	100 000	74 355	Shutdown	Shutdown	Shutdown
SE/2*	120 000	120 000	132 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000	120 000
Total	**220 000**	**220 000**	**232 000**	**220 000**	**220 000**	**220 000**	**220 000**	**194 355**	**120 000**	**120 000**	**120 000**
Switzerland											
CH/1*	55 000	55 000	55 000	55 000	55 000	55 000	32 083	Shutdown	Shutdown	Shutdown	Shutdown
CH/2	26 500	22 000	26 500	26 500	26 500	26 500	26 500	Shutdown	Shutdown	Shutdown	Shutdown
CH/3*	27 000	26 500	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000
Total	**108 500**	**103 500**	**108 500**	**108 500**	**108 500**	**108 500**	**85 583**[2]	**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	Shutdown	Shutdown	Shutdown	Shutdown
UK/2*	89 872	89 000	89 872	89 872	89 872	89 872	89 872	74 855	Shutdown	Shutdown	Shutdown
UK/3*[3]	737 000	738 000	738 000	738 000	738 000	738 000	738 000	738 000	738 000	367 000	367 000
Total	**855 872**	**856 000**	**857 285**	**857 285**	**857 285**	**857 285**	**857 285**	**812 855**	**738 000**	**367 000**	**367 000**

Production capacity of all installations in the Convention area

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
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	4 272 833	3 739 066	3 665 879
%	100	93,8	88,2	84,5	80,2	77,6	77,2	75,5	62,2	60,6	59,4

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

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
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	3 011 775	2 478 009	2 404 822
%	100	99,8	99,6	98,0	91,0	86,8	86,2	84,2	78,8	64,9	63,0

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

[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).

[3] 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.

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
Belgium											
BE/1	NI	173	157	122	82	92	142	88	98	56	60
BE/2	NI	178	180	175	169	186	178	179	142	131	128
BE/3	NI	113	111	88	78	85	82	60	64	67	64
BE/4	NI	173	201	120	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**
Finland											
SFR/1	NI	63	43	41	44	37	56	59	63	42	12
Total	**NI**	**63**	**43**	**41**	**44**	**37**	**56**	**59**	**63**	**42**	**12**
France											
FR/1	NI	28	29	24	15	12	25	21	13	26	14
FR/2	NI	129	119	121	92	118	116	125	119	122	104
FR/3	NI	345	338	226	216	245	189	202	224	244	271
FR/4	NI	192	220	203	152	127	96	106	119	111	100
FR/5	NI	32	32	33	34	33	32	29	29	24	24
FR/6	NI	190	152	139	175	185	147	168	195	188	145
FR/7	NI	281	243	237	202	282	242	290	Shutdown	Shutdown	Shutdown
Total	**1149**	**1197**	**1133**	**983**	**886**	**1002**	**847**	**941**	**699**	**714**	**657**
Germany											
DE/1	NI	111	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/2	NI	147	247	159	127	128	103	94	97	85	77
DE/3	NI	49	73	75	78	80	92	86	91	104	120
DE/4	NI	367	367	358	285	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/5	NI	261	166	162	157	169	173	169	160	151	153
DE/6	NI	70	62	52	49	77	116	64	97	74	95
DE/7	NI	313	257	199	218	289	260	194	179	84	Shutdown
DE/8	NI	193	209	228	174	159	151	170	162	150	126
DE/9	NI	161	165	197	199	213	244	243	207	170	146
DE/10	NI	391	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	NI	104	18	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/12	NI	132	137	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/13	NI	137	171	201	163	146	141	153	158	159	117
DE/14	285	100	112	80	67	64	62	56	55	52	45
DE/15	NI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**285**	**2536**	**1982**	**1711**	**1517**	**1325**	**1343**	**1229**	**1206**	**1029**	**878**
Netherlands											
NL/1	NI	71	68	57	41	45	42	46	22	Shutdown	Shutdown
NL/2	NI	196	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**282**	**267**	**68**	**57**	**41**	**45**	**42**	**46**	**22**		
Portugal											
P/1	NI	130	121	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P/2	NI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**202**	**130**	**121**	**100**							
Spain											
ES/1	NI	61	63	58	48	45	46	38	35	30	24,38
ES/2	NI	30	29	25	16	PC	PC	PC	PC	PC	PC
ES/3	NI	66	57	52	38	42	32	30	27	23	21
ES/4	NI	287	164	114	123	137	121	121	110	102	103

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
ES/5	NI	142	102	101	86	74	92	47	29	34	40
ES/6	NI	182	182	193	185	199	205	203	154	156	89
ES/7	NI	53	49	32	36	30	26	25	25	24	20
ES/8	NI	251	244	176	174	174	154	139	137	120	97
ES/9	123	175	95	103	132	99	94	109	68	70	68
Total	**1057**	**1247**	**985**	**854**	**838**	**800**	**770**	**713**	**585**	**560**	**463**
Sweden											
SE/1	NI	27	28	29	26	22	25	14	Shutdown	Shutdown	Shutdown
SE/2	NI	18	19	18	17	19	22	20	20	20	22
Total	**65**	**45**	**47**	**47**	**43**	**41**	**47**	**34**	**20**	**20**	**22**
Switzerland											
CH/1	NI	82	70	64	73	67	39	Shutdown	Shutdown	Shutdown	Shutdown
CH/2	NI	19	20	28	19	19	11	Shutdown	Shutdown	Shutdown	Shutdown
CH/3	NI	15	19	25	17	12	22	30	32	20	21
Total	**111**	**116**	**109**	**117**	**109**	**98**	**72**	**30**	**32**	**20**	**21**
UK											
UK/1	NI	15	16	17	18	35	54	Shutdown	Shutdown	Shutdown	Shutdown
UK/2	NI	125	144	157	175	144	154	112	Shutdown	Shutdown	Shutdown
UK/3	NI	1 476	1 535	1 439	1 188	1 237	1 155	1 183	1 444	983	1 097
Total	**1493**	**1616**	**1695**	**1613**	**1381**	**1416**	**1363**	**1295**	**1444**	**983**	**1 097**

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	2006	2007	2008
kg/year	8179	7854	6832	6028	5188	4933	4730	4450	4192	3499	3291
%	100	96,0	83,5	73,3	63,4	60,3	57,8	54,4	51,3	42,8	40,2

NI: No information

N/A: Not applicable

PC: Partly 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
Belgium											
BE/1	NI	0,750	0,715	0,556	0,374	0,419	0,649	0,400	0,446	0,258	0,28
BE/2	NI	0,710	0,720	0,699	0,676	0,744	0,712	0,718	0,624	0,639	0,62
BE/3	NI	1,125	0,921	0,736	0,647	0,712	0,684	0,503	0,539	0,558	0,53
BE/4	NI	2,110	2,212	2,890	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Finland											
SFR/1	NI	1,574	1,078	1,026	1,046	0,878	1,324	1,380	1,478	0,994	0.28
France											
FR/1	NI	1,580	1,631	1,317	0,819	0,646	1,400	1,149	0,720	1,416	0,79
FR/2	NI	1,792	1,646	1,680	1,277	1,644	1,615	1,732	1,658	1,689	1,44
FR/3	NI	1,431	1,403	0,940	0,896	1,019	0,785	0,838	0,932	1,011	1,13
FR/4	NI	1,131	1,292	1,197	0,896	0,746	0,567	0,621	0,699	0,650	0,59
FR/5	NI	1,444	1,436	1,457	1,509	1,469	1,402	1,308	1,277	1,086	1,05
FR/6	NI	1,144	0,917	0,836	1,054	1,117	0,883	1,015	1,173	1,135	0,87
FR/7	NI	1,522	1,320	1,286	1,094	1,530	1,312	1,574	Shutdown	Shutdown	Shutdown
Germany											
DE/1	NI	1,707	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/2	NI	1,128	1,766	1,132	1,153	1,163	0,934	0,724	0,743	0,651	0,59
DE/3	NI	0,406	0,583	0,601	0,622	0,640	0,733	0,689	0,730	0,830	0,96
DE/4	NI	1,223	1,223	1,193	1,862	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/5	NI	1,740	1,040	1,010	0.980	1,060	1,083	1,020	0,940	0,890	0,90
DE/6	NI	0,540	0,416	0,348	0,326	0,515	0,777	0,428	0,655	0,496	0,64
DE/7	NI	1,740	1,410	1,130	1,240	1,640	1,479	1,101	1,018	1,156	N/A
DE/8	NI	1,970	1,540	1,680	1,281	1,167	1,111	1,254	1,193	1,102	0,93
DE/9	NI	1,070	1,032	1,182	1,189	1,279	1,464	1,455	1,238	1,014	0,87
DE/10	NI	1,576	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/11	NI	1,740	1,864	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/12	NI	0,843	0,871	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/13	NI	0,910	1,069	1,259	1,019	0,911	0,884	0,956	0,985	0,994	0,74
DE/14	NI	1,390	1,364	0,966	0,815	0,776	0,757	0,680	0,669	0,630	0,55
DE/15	NI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Netherlands											
NL/1	NI	1,008	0,909	0,765	0,551	0,610	0,571	0,615	0,587	Shutdown	Shutdown
NL/2	NI	1,400	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Portugal											
P/1	NI	2,700	2,800	2,300	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
P/2	NI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Spain											
ES/1	NI	2,040	2,020	1,861	1,545	1,430	1,461	1,204	1,122	0,971	0,78
ES/2	NI	2,020	1,948	1,667	1,626	PC	PC	PC	PC	PC	PC

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
ES/3	NI	1,970	1,699	1,563	1,123	1,264	0,945	0,884	0,810	0,682	0,62
ES/4	NI	1,910	1,094	0,762	0,821	0,911	0,811	0,806	0,730	0,683	0,69
ES/5	NI	2,259	1,632	1,608	1,368	1,172	1,461	0,756	0,458	0,548	0,63
ES/6	NI	0,870	0,834	0,885	0,848	0,914	0,944	0,933	0,708	0,715	0,41
ES/7	NI	2,100	1,940	1,265	1,428	1,220	1,030	1,017	1,020	0,969	0,80
ES/8	NI	1,860	1,810	1,300	1,290	1,290	1,140	1,030	1,014	0,890	0,72
ES/9	NI	1,730	0,938	1,021	1,309	0,976	0,933	1,081	0,676	0,693	0,68
Sweden											
SE/1	NI	0,268	0,278	0,288	0,258	0,221	0,248	0,186	Shutdown	Shutdown	Shutdown
SE/2	NI	0,154	0,144	0,154	0,143	0,161	0,188	0,167	0,165	0,166	0,18
Switzerland											
CH/1	NI	1,490	1,271	1,162	1,336	1,227	1,227	Shutdown	Shutdown	Shutdown	Shutdown
CH/2	NI	0,877	0,743	1,054	0,699	0,712	0,429	Shutdown	Shutdown	Shutdown	Shutdown
CH/3	NI	0,560	0,692	0,917	0,638	0,434	0,802	1,110	1,170	0,727	0,76
UK											
UK/1	NI	0,525	0,538	0,574	0,606	1,180	1,852	Shutdown	Shutdown	Shutdown	Shutdown
UK/2	NI	1,410	1,600	1,744	1,950	1,600	1,710	1,494	Shutdown	Shutdown	Shutdown
UK/3[4]	NI	2,000	2,080	1,950	1,610	1,677	1,565	1,603	1,957	2,679	2,99

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

[4] 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
Belgium											
BE/1	290	156	137	106	68	74	120	67	79	43	50
BE/2	176	154	157	153	153	164	160	164	129	122	121
BE/3	146	101	98	74	63	62	64	49	49	52	50
BE/4	160	146	172	80	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**
Finland											
SFR/1	40	53	35	34	39	31	46	54	57	37	39
Total	**40**	**53**	**35**	**34**	**39**	**31**	**46**	**54**	**57**	**37**	**39**
France											
FR/1	26	25	26	21	12	7	14	11	11	12	12
FR/2	111	115	103	108	80	103	106	113	109	96	96
FR/3	301	320	313	210	202	235	181	191	212	226	259
FR/4	179	182	188	171	109	88	67	64	89	84	74
FR/5	330	25	25	26	27	27	26	24	24	19	19
FR/6	24	161	129	109	147	142	118	139	172	159	117
FR/7	160	255	223	186	170	255	217	275	Shutdown	Shutdown	Shutdown
Total	**1131**	**1083**	**1007**	**831**	**747**	**857**	**729**	**818**	**617**	**596**	**577**
Germany											
DE/1	173	105	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/2	92	135	235	146	114	113	98	88	88	78	73
DE/3	84	39	63	68	71	74	86	80	84	82	88
DE/4	255	353	353	345	274	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/5	256	255	160	155	150	163	167	162	153	144	146
DE/6	105	66	58	48	45	72	111	59	48	70	90
DE/7	128	301	244	187	206	276	247	181	166	80	Shutdown
DE/8	280	175	171	179	141	113	114	142	141	139	111
DE/9	150	149	151	185	188	203	233	232	195	158	136
DE/10	354	382	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	105	100	18	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/12	103	119	128	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/13	97	124	158	177	144	135	131	142	148	148	104
DE/14	285	96	110	74	65	62	60	54	53	51	42
DE/15	238	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**2705**	**2399**	**1849**	**1564**	**1398**	**1211**	**1248**	**1140**	**1079**	**950**	**790**
Netherlands											
NL/1	65	65	65	53	37	42	40	42	20	Shutdown	Shudown
NL/2	180	178	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**245**	**243**	**65**	**53**	**37**	**42**	**40**	**42**	**20**	Shutdown	Shutdown

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Portugal											
P/1	92	91	82	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P/2	28	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**120**	**91**	**82**	**69**							
Spain											
ES/1	31	38	45	36	33	38	40	32	30	26	19
ES/2	21	20	19	17	12	PC	PC	PC	PC	PC	PC
ES/3	66	51	43	32	23	31	23	21	21	17	16
ES/4	210	218	118	69	80	114	105	101	92	92	89
ES/5	109	91	85	91	77	63	74	38	20	20	26
ES/6	126	157	165	178	171	182	193	188	146	144	83
ES/7	48	35	27	22	28	26	22	22	22	21	18
ES/8	203	227	204	155	148	151	128	117	117	101	82
ES/9	123	152	74	84	112	81	85	93	59	62	61
Total	**937**	**989**	**780**	**684**	**684**	**686**	**670**	**613**	**509**	**483**	**394**
Sweden											
SE/1	37	25	25	27	23	20	23	13	Shutdown	Shutdown	Shutdown
SE/2	21	17	17	17	15	16	20	18	19	18	20
Total	**58**	**42**	**42**	**44**	**38**	**36**	**43**	**31**	**19**	**18**	**20**
Switzerland											
CH/1	57	75	63	58	69	65	38	Shutdown	Shutdown	Shutdown	Shutdown
CH/2	18	19	19	27	18	18	11	Shutdown	Shutdown	Shutdown	Shutdown
CH/3	21	10	14	17	14	8	17	22	27	15	17
Total	**96**	**104**	**96**	**102**	**101**	**91**	**66**	**22**	**27**	**15**	**17**
UK											
UK/1	14	14	14	13	13	29	49	Shutdown	Shutdown	Shutdown	Shutdown
UK/2	106	117	137	149	169	137	147	108	Shutdown	Shutdown	Shutdown
UK/3	1107	1292	1269	1270	1048	1053	1010	958	1322	876	951
Total	**1227**	**1423**	**1420**	**1432**	**1230**	**1219**	**1206**	**1066**	**1322**	**876**	**951**

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

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
kg/year	7331	6985	5940	5226	4558	4475	4392	4066	3906	3197	3009
%	100	95,3	81,0	71,3	62,2	61	59,9	55,5	53,3	43,6	41,0

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

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

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
BE/1	1,320	0,680	0,627	0,484	0,310	0,338	0,547	0,307	0,360	0,196	0.23
BE/2	0,705	0,617	0,627	0,615	0,611	0,657	0,641	0,654	0,565	0,598	0.59
BE/3	1,213	1,013	0,813	0,615	0,524	0,516	0,531	0,411	0,412	0,432	0.42
BE/4	1,770	1,780	1,888	1,930	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
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
FR/2	1,540	1,600	1,424	1,498	1,111	1,433	1,469	1,570	1,510	1,333	1,336
FR/3	1,250	1,330	1,300	0,871	0,838	0,976	0,752	0,792	0,880	0,938	1,076
FR/4	1,050	1,068	1,108	1,004	0,641	0,518	0,396	0,375	0,525	0,493	0,436
FR/5	1,790	1,123	1,132	1,159	1,199	1,186	1,153	1,087	1,075	0,849	0,829
FR/6	1,080	0,971	0,776	0,660	0,886	0,853	0,712	0,840	1,035	0,958	0,702
FR/7	0,960	1,381	1,210	1,011	0,921	1,384	1,176	1,494	Shutdown	Shutdown	Shutdown
Germany											
DE/1	1,330	1,610	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/2	0,710	1,040	1,680	1,040	1,040	1,030	0,890	0,680	0,680	0,600	0.56
DE/3	0,700	0,322	0,507	0,546	0,571	0,592	0,687	0,639	0,673	0,653	0,70
DE/4	1,700	1,175	1,175	1,150	1,792	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
DE/6	1,609	0,510	0,390	0,322	0,303	0,481	0,745	0,396	0,324	0,471	0,608
DE/7	0,800	1,670	1,340	1,060	1,170	1,570	1,405	1,030	0,952	1,093	Shutdown
DE/8	1,400	1,790	1,260	1,320	1,039	0,834	0,842	1,042	1,038	1,020	0,815
DE/9	1,000	0,995	0,942	1,106	1,125	1,215	1,396	1,387	1,170	0,946	0,812
DE/10	1,180	1,540	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	2,100	1,660	1,846	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/12	1,431	0,760	0,815	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/13	0,620	0,829	0,989	1,108	0,898	0,841	0,820	0,890	0,924	0,924	0,648
DE/14	0,950	1,330	1,330	0,900	0,787	0,756	0,734	0,653	0,645	0,616	0,515
DE/15	1,980	Shut down	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Netherlands											
NL/1	0,920	0,927	0,873	0,716	0,501	0,560	0,542	0,559	0,546	Shutdown	Shutdown
NL/2	1,230	1,270	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
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
P/2	1,061	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
ES/1	0,960	1,260	1,420	1,141	1,041	1,220	1,265	1,030	0,970	0,818	0,618
ES/2	1,430	1,330	1,272	1,153	1,166	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
ES/4	1,400	1,450	0,784	0,462	0,537	0,760	0,699	0,674	0,616	0,614	0,594
ES/5	1,735	1,442	1,347	1,455	1,226	1,001	1,178	0,603	0,328	0,314	0,409

Mercury losses from the chlor-alkali industry in 2008

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
ES/6	0,603	0,750	0,758	0,818	0,784	0,836	0,885	0,863	0,670	0,661	0,381
ES/7	1,900	1,400	1,060	0,880	1,120	1,040	0,880	0,890	0,880	0,860	0,71
ES/8	1,500	1,680	1,510	1,140	1,100	1,120	0,950	0,870	0,864	0,750	0,604
ES/9	1,220	1,500	0,735	0,831	1,110	0,800	0,843	0,925	0,589	0,616	0,609
Sweden											
SE/1	0,370	0,250	0,250	0,270	0,234	0,204	0,231	0,173	Shutdown	Shutdown	Shutdown
SE/2	0,171	0,139	0,131	0,140	0,121	0,135	0,167	0,151	0,155	0,147	0,166
Switzerland											
CH/1	1,030	1,370	1,146	1,065	1,258	1,176	1,176	Shutdown	Shutdown	Shutdown	Shutdown
CH/2	0,680	0,848	0,710	1,019	0,670	0,689	0,408	Shutdown	Shutdown	Shutdown	Shutdown
CH/3	0,780	0,370	0,517	0,625	0,515	0,315	0,647	0,820	0,985	0,548	0,619
UK											
UK/1	0,483	0,470	0,461	0,452	0,438	1,004	1,669	Shutdown	Shutdown	Shutdown	Shutdown
UK/2	1,179	1,310	1,520	1,660	1,880	1,520	1,640	1,446	Shutdown	Shutdown	Shutdown
UK/3	1,501	1,750	1,720	1,720	1,420	1,427	1,368	1,298	1,791	2,387	2,59

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

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

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Belgium											
BE/1	NI	837	6823	260	2889	2293	4608	5405	304	1928	367
BE/2	NI	5733	3566	4646	358	NI	250	5 949	1 139	3802	2702
BE/3	NI	3	5	6	67	6	5	3	6	3	0
BE/4	NI	0	2	1 242	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**8529**	**6573**	**10 396**	**6154**	**3254**	**2299**	**4863**	**11357**	**1449**	**5733**	**3070**
Finland											
SFR/1	0	0	0,16	0	0	0	0	0	0,2	0,3	0,21
Total	**0**	**0**	**0,16**	**0**	**0**	**0**	**0**	**0**	**0,2**	**0,3**	**0,21**
France											
FR/1	NI	0	0	0	18	33	75	17	0	0	0
FR/2	NI	68	2632	9644	8896	6230	7268	7309	10 428	4858	7156
FR/3	NI	1257	1296	1078	922	1323	1143	1423	2106	1066	1268
FR/4	NI	54	37	43	41	34	26	34	0	20	34
FR/5	NI	0	70	6	238	13	3	NI	2,5	3	3
FR/6	NI	33	16	64	48	25	15	9	18	18	0
FR/7	NI	24	35	8	25	24	44	32	Shutdown	Shutdown	Shutdown
Total	**344**	**1436**	**4086**	**10 843**	**10 188**	**7682**	**8574**	**8824**	**12 555**	**5965**	**8461**
Germany											
DE/1	NI	31	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/2	NI	4	0	NI	NI	NI	138	182	120	85	65
DE/3	NI	2	3	2	1	NI	NI	NI	3	207	223
DE/4	NI	3054	3054	1259	3437	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/5	NI	66	576	766	5799	10 555	10 027	4958	1762	2514	855
DE/6	NI	1314	3764	1034	472	1591	1551	496	1386	5602	1726
DE/7	NI	37 260	20 602	13 200	13 390	12 260	16 490	15 330	59 991	55 830	Shutdown
DE/8	NI	1646	2311	NI	674	2282	1536	356	358	553	431
DE/9	NI	2270	4570	4230	6366	5340	4355	3239	3241	0	2324
DE/10	NI	304	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE/11	NI	19	NI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/12	NI	176	176	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
DE/13	NI	2692	5659	9209	4378	2745	2500	2780	2309	1888	120109
DE/14	NI	1656	754	833	406	85	212	71	96	72	6289
DE/15	NI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**26 200**	**50 494**	**41 469**	**30 533**	**34 923**	**34 858**	**36 808**	**27 412**	**63 266**	**66 751**	**132 023**
Netherlands											
NL/1	NI	6	2	28	7	3	2	1	0	Shutdown	Shutdown
NL/2	NI	0	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**38**	**6**	**2**	**28**	**7**	**3**	**2**	**1**	**0**		

* All mercury-contaminated materials, such as cell components, process equipment, solid wastes from sumps, pits, demercurisation un its and t he bri ne p urification process, w hich hav e bee n sent to author ised an d properly controlled toxic waste disposal sites, are to be included in the category "safely deposited waste". For the purpose of the balance, all deposits of mercury in whatever concentrations should be accounted for.

Mercury losses from the chlor-alkali industry in 2008

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Portugal											
P/1	NI	0	0	0	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
P/2	NI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Total	**689**	**0**	**0**	**0**	**0**	**0**	**0**				
Spain											
ES/1	NI	1265	4276	495	2027	846	408	1297	807	1107	627
ES/2	NI	27	8	9	141	PC	PC	PC	PC	PC	PC
ES/3	NI	384	599	359	472	679	402	323	370	376	373
ES/4	NI	2694	6279	4868	2343	2020	2837	3549	3938	2899	3147
ES/5	NI	1013	41	5	440	1544	188		208	161	44
ES/6	NI	604	770	1088	2339	2625	622	900	1043	3776	906
ES/7	NI	20	10	3	13	14	NI	315	9	11	0
ES/8	NI	498	432	459	552	328	506	633	551	1035	652
ES/9	NI	500	401	279	169	349	185	217	156	1105	1220
Total	**657**	**7005**	**13 187**	**7619**	**8056**	**7301**	**6503**	**9114**	**7082**	**10 470**	**6970**
Sweden											
SE/1	NI	6	6	850	5	NI	55	NI	NI	Shutdown	Shutdown
SE/2	NI	1	1	1	NI	NI	NI	NI	NI	0	0
Total	**42**	**7**	**7**	**851**	**5**	**NI**	**55**	**NI**	**0**		
Switzerland											
CH/1	NI	165	178	215	207	239	139	Shutdown	Shutdown	Shutdown	Shutdown
CH/2	NI	0	3	32	1	2	1	Shutdown	Shutdown	Shutdown	Shutdown
CH/3	NI	1084	0	1933	NI	1891	NI	1859	0	1948	1787
Total	**1 905**	**1249**	**181**	**2180**	**208**	**2132**	**140**	**1859**	**0**	**1948**	**1787**
UK											
UK/1	NI	161	268	263	136	118	246	Shutdown	Shutdown	Shutdown	Shutdown
UK/2	NI	37	48	147	113	119	134	43	Shutdown	Shutdown	Shutdown
UK/3	NI	3 911	3 092	2 842	10 745	21 247	6 208	6 446	15 905	11 703	1659
Total	**3 187**	**4 109**	**3 408**	**3 252**	**10 994**	**21 484**	**6 588**	**6 489**	**15 905**	**11 703**	**1659**

NI: No information

N/A: Not applicable

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

* All mercury-contaminated materials, such as cell components, process equipment, solid wastes from sumps, pits, demercurisation un its and t he bri ne p urification process, w hich hav e bee n sent to author ised an d properly controlled toxic waste disposal sites, are to be included in the category "safely deposited waste". For the purpose of the balance, all deposits of mercury in whatever concentrations should be accounted for.

Mercury losses from the chlor-alkali industry in 2008

Site	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
ES/1	NI	42,150	136,300	15,759	64,604	27	12,995	41,354	25,733	35,286	19,986
ES/2	NI	1,800	0,556	0,607	14,300	PC	PC	PC	PC	PC	PC
ES/3	NI	11,460	17,850	10,703	14,056	20	11,977	9,624	11,034	11,212	11,121
ES/4	NI	17,960	41,860	32,450	15,620	13	18,910	23,662	26,255	19,325	20,98
ES/5	NI	16,085	6,564	0,943	0,005	7	24,606	29,962	3,315	2,566	0,70
ES/6	NI	2,890	3,533	4,994	10,737	12	2,857	4,129	4,785	17,331	4,16
ES/7	NI	0,800	0,380	0,120	0,528	1	NI	12,600	0,362	0,443	0,00
ES/8	NI	3,690	3,200	3,400	4,090	2	3,750	4,690	4,080	7,670	4,832
ES/9	NI	4,950	3,970	2,767	1,673	3	1,830	2,150	1,546	10,946	12,087
Sweden											
SE/1	NI	0,064	0,064	8,500	0,052	NI	0,553	NI	Shutdown	Shutdown	Shutdown
SE/2	NI	0,011	0,010	0,010	NI	NI	NI	NI	0	0	0
Switzerland											
CH/1	NI	3,000	3,230	3,900	3,774	4,350	4,350	Shutdown	Shutdown	Shutdown	Shutdown
CH/2	NI	0	0,104	1,216	0,021	0,061	0,030	Shutdown	Shutdown	Shutdown	Shutdown
CH/3	NI	40,910	0	71,602	NI	70,048	NI	68,835	0	72,163	66,2
UK											
UK/1	NI	5,540	9,115	8,938	4,631	4,001	8,359	Shutdown	Shutdown	Shutdown	Shutdown
UK/2	NI	0,420	0,530	1,640	1,260	1,330	1,490	0,573	Shutdown	Shutdown	Shutdown
UK/3	NI	5,300	4,190	3,850	14,560	28,790	8,412	8,734	21,552	31,887	4,52

NI: No information

N/A: Not applicable

PC: Partly converted to membrane technology

4. 2008 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 Agreement 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	
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 Albemarl	e PPC	Thann	
FR/3 Solvay		Tavaux	
FR/4 A	rkema	Jarrie	
FR/5 SPC	Harbonnières	Harbonnières	
FR/6 Arkem	a	Lavera	
FR/7	Arkema	St Auban	Closed down
Germany [5]			
DE/1	ECI	Bitterfeld	Ceased operation in 1999
DE/2	Bayer	Uerdingen	Converted to membrane
DE/3 Akzo	Nobel	Ibbenbüren	
DE/4	Bayer	Leverkusen	Shut down in 2002
DE/5 BASF		Ludwigshafen	
DE/6 Ineos		Wilhelmshafen	
DE/7	Vestolit	Marl	Shut down of some cells in 2001. Only the period of time in production before the definitive shut down considered
DE/8 Deg	ussa - Hüls	Lülsdorf	
DE/9	Lil	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	
DE/14 Vinnolit		Gendorf	
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
Portugal			

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

Country/Code	Company	Location	Status
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 Electro	quimica 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	
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

4.2.1 Other OSPAR Contracting Parties

This section presents the status of the chlor-alkali industry within 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.

Figure 4a: Maps showing the location of the mercury-based chlor-alkali plants (Sweden)

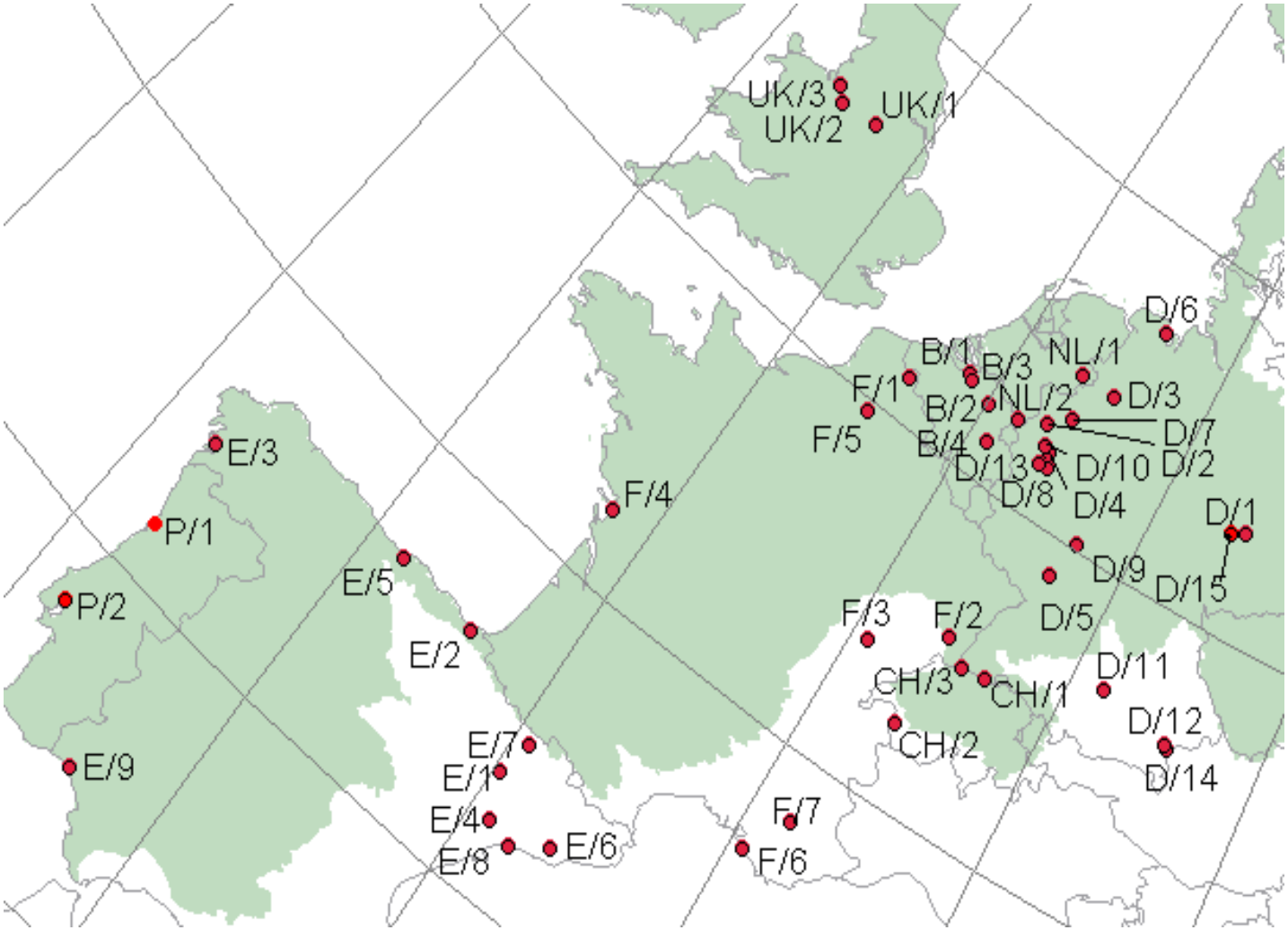

Figure 4b: Maps showing the location of the mercury-based chlor-alkali plants (Rest of Contracting Parties)

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)
BE/1	219 000	A	R	35.46	0.03	0.01	0.06	0.17	0.23	0.28	1.68	-0.75	0.00	0.00	17.55	15.95
BE/2	205 000	A	R	17.97	0.02	0.01	0.00	0.59	0.59	0.62	13.18	2.60	-1.75	0.00	4.16	0.00
BE/3	120 000	A	R	-16.51	0.03	0.08	0.05	0.37	0.42	0.53	0.00	1.29	0.00	0.00	10.78	-27.83
Total	**544 500**															

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	
	(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)
SFR/1	42 485	Baltic	R	-552.93	0.02	0.06	0.00	0.92	0.92	0.28	0.00	-3.94	4.27	0.00	7.75	-561.68
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	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)
FR/1	18 040	A	R	14.91	0.02	0.11	0.02	0.64	0.66	0.79	0.00	-0.06	0.00	0.00	-3.33	17.45
FR/2	72 000	A	R	26.82	0.08	0.03	0.07	1.27	1.34	1.44	99.39	-0.48	-5.02	0.00	-76.33	2.32
FR/3	240 900	M	R	8.17	0.05	0.00	0.08	1.00	1.08	1.13	5.26	0.00	0.22	0.00	0.90	0.88
FR/4	170 070	M	R	10.44	0.03	0.12	0.01	0.42	0.44	0.59	0.20	0.03	0.00	0.00	0.17	9.49
FR/5	22 500	A	R	13.78	0.22	0.00	0.83	0.00	0.83	1.05	0.15	0.20	0.00	0.00	8.68	3.89
FR/6	166 000	M	R	9.80	0.05	0.12	0.00	0.70	0.70	0.87	0.00	0.00	0.00	0.00	0.00	8.93
Total	**689509**															

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)
DE/2	130 000	A	R	4,92	0,03	0,00	0,03	0,53	0,56	0,59	0,50	0,00	0,00	0,00	0,00	3,82
DE/3	125 276	A	R	0,11	0,26	0,00	0,00	0,70	0,70	0,96	1,78	-0,28	-0,04	0,00	-2,62	0,00
DE/5	170 000	A	R	22,93	0,03	0,01	0,00	0,86	0,86	0,90	5,03	3,40	0,00	0,00	20,00	-3,00
DE/6	148 828	A	R	12,09	0,02	0,01	0,00	0,61	0,61	0,64	11,60	0,00	2,85	-3,00	-1,04	0,90
DE/8	135 951	A	R	1,63	0,10	0,01	0,01	0,80	0,82	0,93	3,17	0,40	-0,03	0,00	2,71	-5,19
DE/9	167 000	A	R	16,60	0,05	0,01	0,09	0,73	0,81	0,87	13,92	0,00	2,30	-2,32	-0,17	1,98
DE/13	160 000	A	R	587,77	0,07	0,02	0,02	0,63	0,65	0,74	750,68	-18,53	3,61	0,00	-93,23	-70,41
DE/14	82 355	Bl Sea	R	75,37	0,03	0,00	0,02	0,49	0,52	0,55	76,37	0,13	-0,09	0,00	0,42	-1,96
Total	**1 119 410**															

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)
ES/1	31 373	M	R	19,06	0,14	0,02	0,00	0,62	0,62	0,78	19,99	0,00	-0,19	0,00	-5,98	4,28
ES/3	33 552	A	R	14,19	0,13	0,01	0,00	0,48	0,49	0,62	11,12	0,00	0,00	0,00	0,03	2,41
ES/4	150 000	M	R	25,33	0,07	0,03	0,00	0,59	0,59	0,69	20,98	0,00	0,02	0,00	0,13	3,53
ES/5	62 747	A	W	2,12	0,17	0,06	0,00	0,41	0,41	0,63	0,70	0,00	0,00	0,00	0,00	0,79
ES/6	217 871	M	R	12,85	0,02	0,01	0,03	0,35	0,38	0,41	4,16	-0,18	0,54	-0,52	-0,71	8,99
ES/7	25 000	M	R	8,80	0,09	0,01	0,01	0,70	0,71	0,80	0,00	0,00	0,00	0,00	0,00	8,00
ES/8	135 004	M	R	17,18	0,07	0,05	0,00	0,60	0,60	0,72	4,83	0,53	0,00	0,00	3,90	7,73
ES/9	100 929	A	R	5,74	0,06	0,01	0,01	0,60	0,61	0,68	12,09	-0,71	0,00	-0,69	-13,85	6,82
Total	**756 475**			**14,44**	**0,07**	**0,03**	**0,01**	**0,51**	**0,52**	**0,61**	**9,21**	**-0,05**	**0,15**	**-0,24**	**-1,58**	**6,19**

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	120 000	A	R	22,79	0,01	0,00	0,00	0,17	0,17	0,18	0,00	-2,40	0,00	0,00	-19,96	42,57
Total	**120 000**															

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)
CH/3	27 000	A	R	32,59	0,11	0,03	0,00	0,62	0,62	0,76	66,20	0,00	-0,93	0,00	-34,37	0,00
Total	**27 000**															

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/3	367 000	A	W	50,41	0,08	0,32	0,21	2,38	2,59	2,99	4,52	10,92	0,00	0,00	29,75	13,15
Total	**367 000**															

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

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ISBN 978-1-907390-51-7
Publication Number: 510/2010