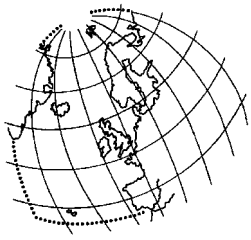
Mercury Losses from the Chlor-Alkali Industry in 1999



OSPAR Commission
2001

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 of the OSPAR Report on Mercury Losses from the Chlor-Alkali Industry in 1999

This report continues the series of reports on mercury discharges, emissions and losses of mercury by all routes from mercury-cell chlor-alkali plants. OSPAR acknowledges the assistance of EuroChlor in assembling the information.

After several years of more or less stable production capacities until 1998, mercury-cell-based chlorine production capacities have decreased in 1999. Capacity reductions in Germany and Portugal seem to be mainly responsible for this decrease. Mercury Losses through Product, Waste Water and Air have slightly decreased from 1998 to 1999 except for the UK, for which a slight increase is indicated. This was due to a temporary problem of the water supply to one plant in the UK.

Over the years, atmospheric emissions of mercury have been significantly reduced. Subsequent to 1997, however, UK emissions slightly increased. The data show clearly that all plants comply with the limit value for air emissions (established by PARCOM Decision 90/3) of 2 g of mercury per tonne of chlorine produced: actual values range from 0,25 to 1,9 g per tonne.

The complexity of the activities involved in handling mercury wastes (deposited, awaiting recovery, awaiting disposal, awaiting decision and temporarily stored) is clearly visible. No unique interpretation of the data is possible. Nevertheless, the data show that, in comparison with the amounts included in the data for Total Emissions, Discharges and Losses, wastes include significant amounts of mercury (ranging from zero up to 207,0 g of mercury per tonne of chlorine produced (mean value: 11,8 g of mercury per tonne produced). These are safely disposed of.

It is difficult to interpret the figures ("Difference to Balance") for the difference between the amounts of mercury used, and the amounts which can be accounted for as losses to air and water, as included in products and as waste. A longer run of figures is needed. The standardisation of "Difference to Balance" reporting was only recently achieved.

A one-off round of reporting to evaluate Contracting Parties' compliance with, and implementation of, OSPAR measures on the chlor alkali industry (other than PARCOM Decision 90/3) was carried out. This showed that all the mercury-cell chlor-alkali plants operating in the OSPAR catchment area complied with these measures.

Récapitulatif du rapport OSPAR sur les pertes de mercure de l'industrie de l'électrolyse des chlorures alcalins en 1999

Le présent rapport est la suite de la série de rapports sur les rejets, les émissions et les pertes, par toutes les voies, de mercure des installations d'électrolyse des chlorures alcalins à cellules de mercure. OSPAR est consciente de l'aide qu'EuroChlor a apportée pour rassembler les renseignements voulus.

Après que les capacités de production soient restées plus ou moins stables jusqu'en 1998, les capacités de production du chlore à base de cellules de mercure ont baissé en 1999. Il semble que les baisses des capacités de production allemande et portugaise soient à l'origine de cette diminution. Les pertes de mercure par le biais des produits, des eaux usées et de l'atmosphère ont légèrement baissé de 1998 à 1999, excepté dans le cas du Royaume-Uni, où une légère augmentation a été signalée. Cette situation était due à un problème temporaire d'alimentation en eau d'une installation implantée au Royaume-Uni.

Au fil des années, les émissions atmosphériques de mercure ont sensiblement baissé. Toutefois, les émissions du Royaume-Uni ont légèrement augmenté après 1997. Les données prouvent clairement que toutes les usines se sont conformées au plafond applicable aux émissions atmosphériques (fixé par la Décision PARCOM 90/3), soit 2 g de mercure par tonne de chlore produit ; dans la réalité, les valeurs se situent entre 0,25 et 1,9 g par tonne.

La complexité des opérations de traitement des déchets de mercure (mis en dépôt, en attente de récupération, en attente d'élimination, en attente d'une décision et stocké provisoirement) est évidente. Aucune interprétation unique des données n'est possible. Néanmoins, elles démontrent que par rapport aux quantités prises en compte dans les totaux des émissions, des rejets et des pertes, les déchets comprennent des quantités significatives de mercure (qui vont de 0 à 207 g de mercure par tonne de chlore produit (la moyenne étant de 11,8 g de mercure par tonne produite). Ces quantités sont éliminées sans danger.

Il est difficile d'interpréter les chiffres (« Différence par rapport au bilan ») qui représentent la différence entre les quantités de mercure utilisé, et les quantités qui peuvent être décomptées comme des pertes dans l'atmosphère et dans l'eau, comme intégrées à des produits et comme des déchets. Une série de statistiques plus longue est nécessaire. La standardisation de la notification de la « Différence par rapport au bilan » n'a été obtenue que tout récemment.

Une campagne ponctuelle de notification destinée à apprécier la mesure dans laquelle les Parties contractantes se sont conformées aux mesures OSPAR visant l'industrie de l'électrolyse des chlorures alcalins (autres que la Décision PARCOM 90/3) et les ont mises en œuvre. Les résultats de cette campagne prouvent que toutes les installations d'électrolyse des chlorures alcalins à cellules de mercure exploitées dans le bassin versant d'OSPAR se sont conformées à ces mesures.

1. Introduction

1. 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.

2. 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.

3. 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 harmonise the way in which data and information are being established and reported, the Programmes and Measures Committee (PRAM) of the OSPAR Commission adopted in 2000 the current reporting formats and procedures (see OSPAR agreement reference number 2000-4), 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;

- via Contracting Parties.

  Data and information on the intended future phasing out of national mercury-based chlor alkali production capacities (or their conversion to mercury free capacities) in the light of the recommendation set out in Art. 3 of PARCOM Decision 90/3.

  OSPAR 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.

4. It should be noted that PRAM 2000 also initiated a one-off reporting to evaluate Contracting Parties' compliance with and implementation of the measures applicable under OSPAR as regards the chlor alkali industry (except PARCOM Decision 90/3). The outcome of this one-off reporting (situation 1998) has been examined by HSC 2001 and is published in this report (see Annex 1).

2. Assessment of the Annual OSPAR Report on Mercury Losses from the Chlor-Alkali Industry in 1999

5. After several years of more or less stable production capacities until 1998 (see Figure 1), mercury-cell-based chlorine production capacities have decreased in 1999. Capacity reductions in Germany and Portugal seem to be mainly responsible for this decrease.

6. Mercury Losses through Product, Waste Water and Air (see Figure 2) have slightly decreased from 1998 to 1999 except for the UK, for which a slight increase is indicated. This was due to a temporary problem of the water supply to one plant in the UK. The data of the Finnish plant are not indicated in Figure 2 due to the fact that Finland has only reported data from 1996-1998 on a voluntary basis. Finland has only one plant which is not discharging into the OSPAR catchment area. However, data for Finland on atmospheric emissions in 1999 are presented in Figure 3.

7. Over the years, atmospheric emissions of mercury have been significantly reduced. Subsequent to 1997, however, UK emissions slightly increased.

8. Concerning the valuable data provided by Euro Chlor on mercury consumption and mercury in wastes, the complexity of activities of the companies with regard to the handling of mercury wastes (deposited, awaiting recovery, awaiting disposal, awaiting decision and temporarily stored) is clearly visible. There is no unique interpretation of the data possible as, for example, in the case of the data on Total Emissions, Discharges and Losses.

9. Nevertheless the data for the plants show that compared to the data for Total Emissions, Discharges and Losses considerable big amounts of mercury from wastes ranging from zero up to 207,0 g Hg/t Cl_2 (mean value: 11,8 g Hg/t Cl_2) are safely disposed of.

10. There is no indication in the tables whether high values are caused or influenced by decommissioning of the respective plants or parts of their chlorine production capacity.

11. Only two plants in Germany have stated that mercury waste is awaiting decision.

12. A better understanding of the figures for Difference to Balance is necessary, and it would be useful to have a reliable quantitative estimate of how Difference to Balance compares with the mercury losses to air, water and products as well as a comparison with the data concerning mercury in wastes over a long period. However, the standardisation of Difference to Balance reporting only happened recently, and this may therefore be difficult to obtain.

13. The data in this report show clearly that every plant complies with the limit value of 2 g Hg/t Cl_2 for air emissions. There is a range in actual values from 0,25 to 1,9 g Hg/t Cl_2. The extent to which these values are considered to reflect BAT in general or only for individual plants concerned is not clear. However, the EC Reference Document on Best Available Techniques in the Chlor-Alkali Industry (August 2000) identified best available techniques which result in emissions, discharges and losses that are much lower than the limit value of 2 g Hg/t Cl_2 specified in PARCOM Decision 90/3.

14. In view of missing information on phasing out of mercury-based chlor-alkali production capacities, future annual OSPAR reports should be completed as soon as possible with information from Contracting Parties if and when this information becomes available. So far, the following information has been provided:

- Germany submitted a time-table which gives a picture on phasing-out measures from 1999 up to 2006;
- Finland and Sweden have confirmed that the mercury-based production of chlorine will be ceased by 2010;

- Switzerland has indicated that there are no specific phasing-out-plans but that the two mercury-based plants will follow the voluntary commitments offered by Euro Chlor.

15. Further information will also arise from the national assessments of mercury-cell based chlor alkali industry in order to establish an objective picture of the national implementation of the recommendation given in PARCOM Decision 90/3, and the associated reports to 2000 meeting of the Working Group on Point and Diffuse Sources on the progress with (or outcome of) these assessments.

16. The Expert Panel that undertook this assessment recommended a number of adjustments that might be considered for future reports in order to improve the assessment. However, it was recognised that for a number of these, disproportional efforts may be required to locate data from previous years (back to 1982) which may not exist nor be readily available or reliable. The points for consideration by OSPAR were:

- Information on chlorine production capacity with mercury cells in the OSPAR catchment area on a plant-by-plant basis would allow individual capacities to be assessed as well as the overall capacity of all plants concerned in the OSPAR catchment area.
- Details of Mercury Losses through Product, Waste Water and Air (kg/a and g Hg/t Cl_2), based on individual plants would allow plant-by-plant comparisons and the establishment of overall figures for these losses.
- Atmospheric Emissions of Mercury on a plant-by-plant basis would allow comparisons and the establishment of overall emission figures.
- To gain more transparency concerning the overall situation for mercury in wastes, future reports could include a table showing the amount of mercury (in kg/a and g Hg/t Cl_2) which is safely disposed of with wastes over the whole time period (from 1982 onwards).
- Plants undergoing decommissioning processes could be flagged up in the tables or removed from the annual report.
- It would be useful to examine the best options for obtaining a reliable quantitative estimate of how Difference to Balance compares with the mercury losses to air, water and products as well as a comparison with the data concerning mercury in wastes over a long period.

3. Evolution of Mercury Losses from the Chlor Alkali Industry (1982-1999)

17. The following Figures give a rough indication of the evolution of mercury losses from the chlor alkali industry in the period 1982-1999 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.

18. 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.

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

20. 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.

21. 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.

22. 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.

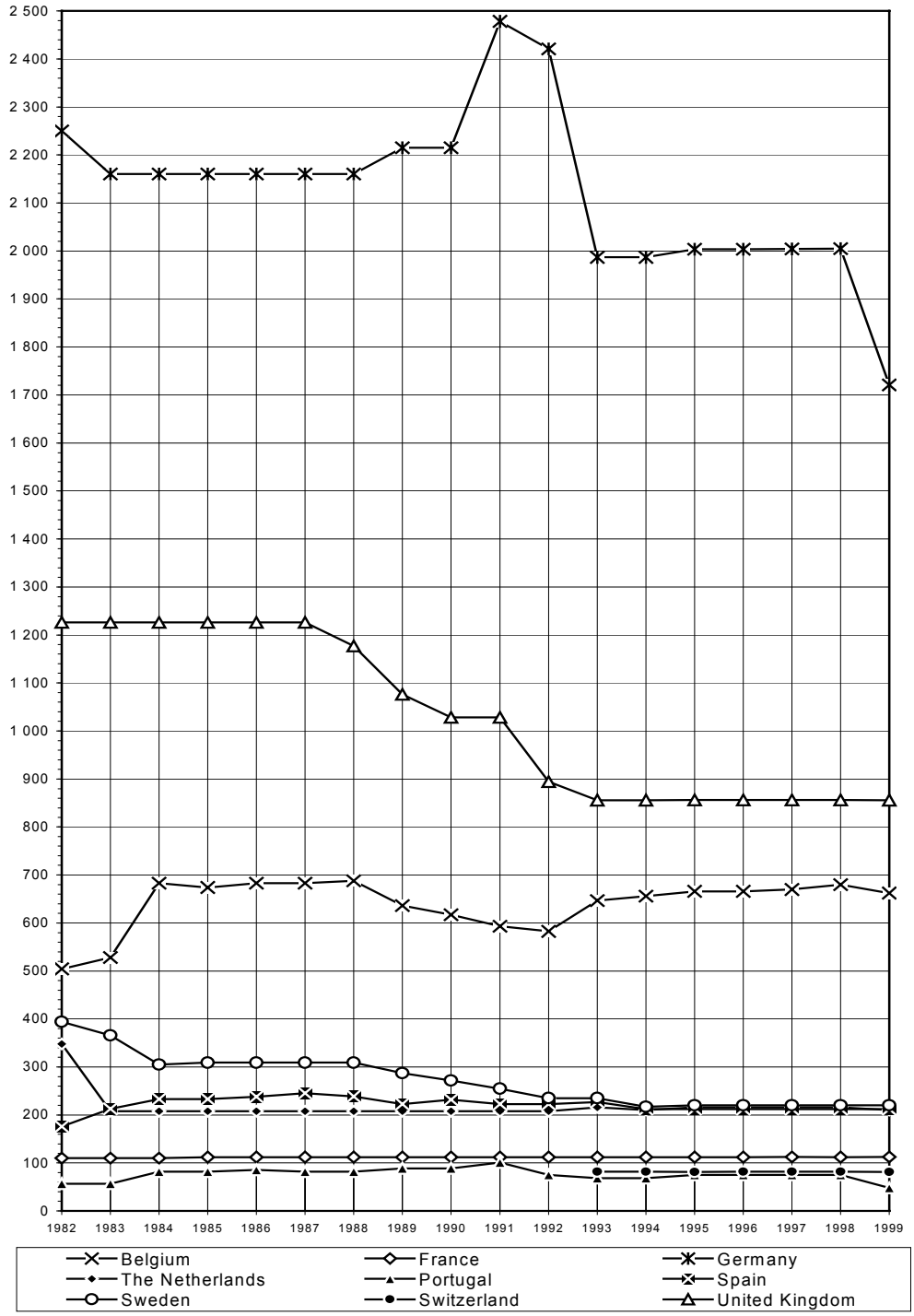


Figure 1: Chlorine Production Capacity with Mercury Cells of plants discharging into the OSPAR catchment area
(in kilotonnes per year)

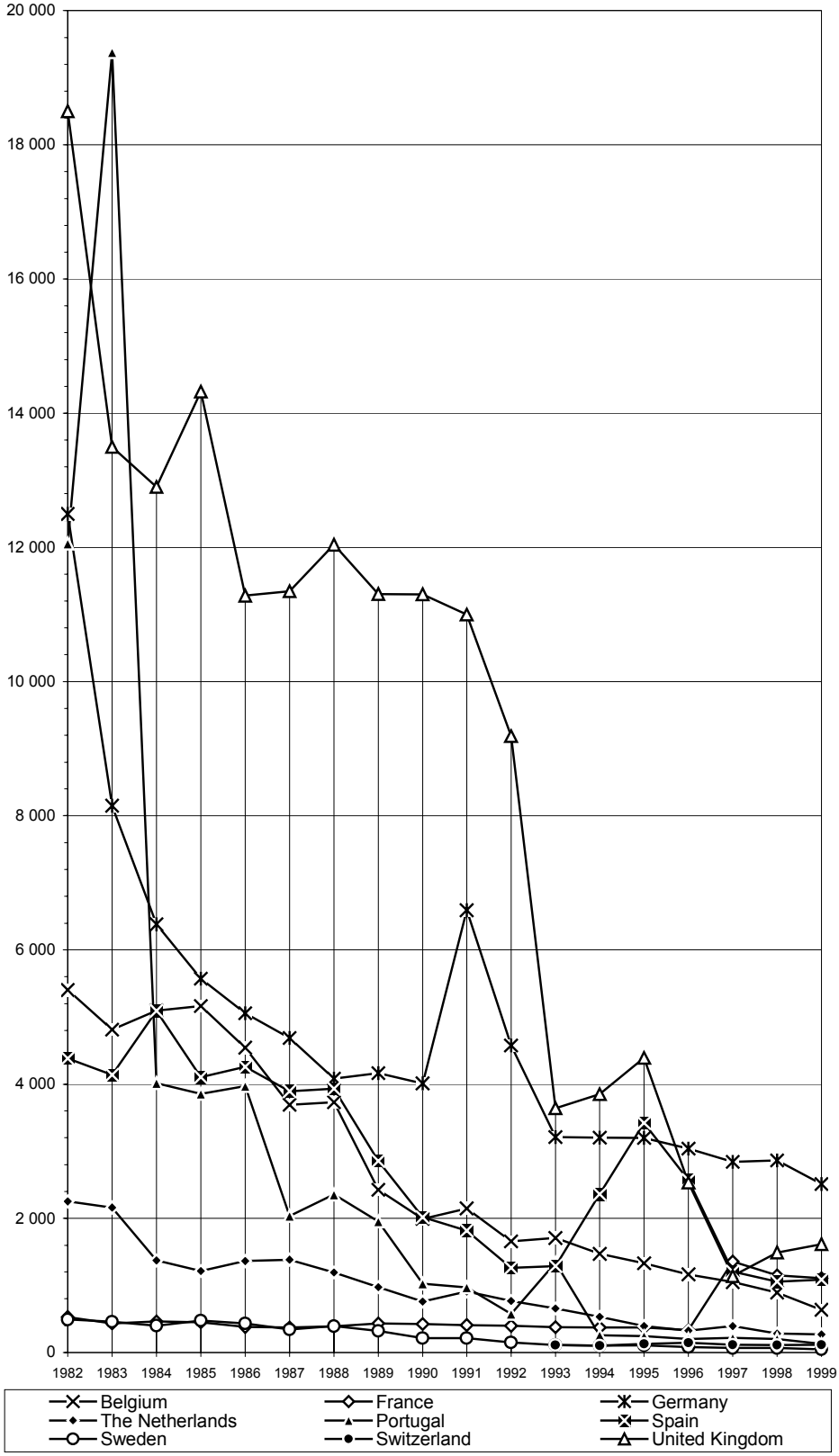


Figure 2: Mercury Losses through Product, Wastewater and Air
(in kilograms per year, sum of mercury losses to product and wastewater from national plants discharging into the OSPAR catchment area plus atmospheric emissions from all national plants except Finland)

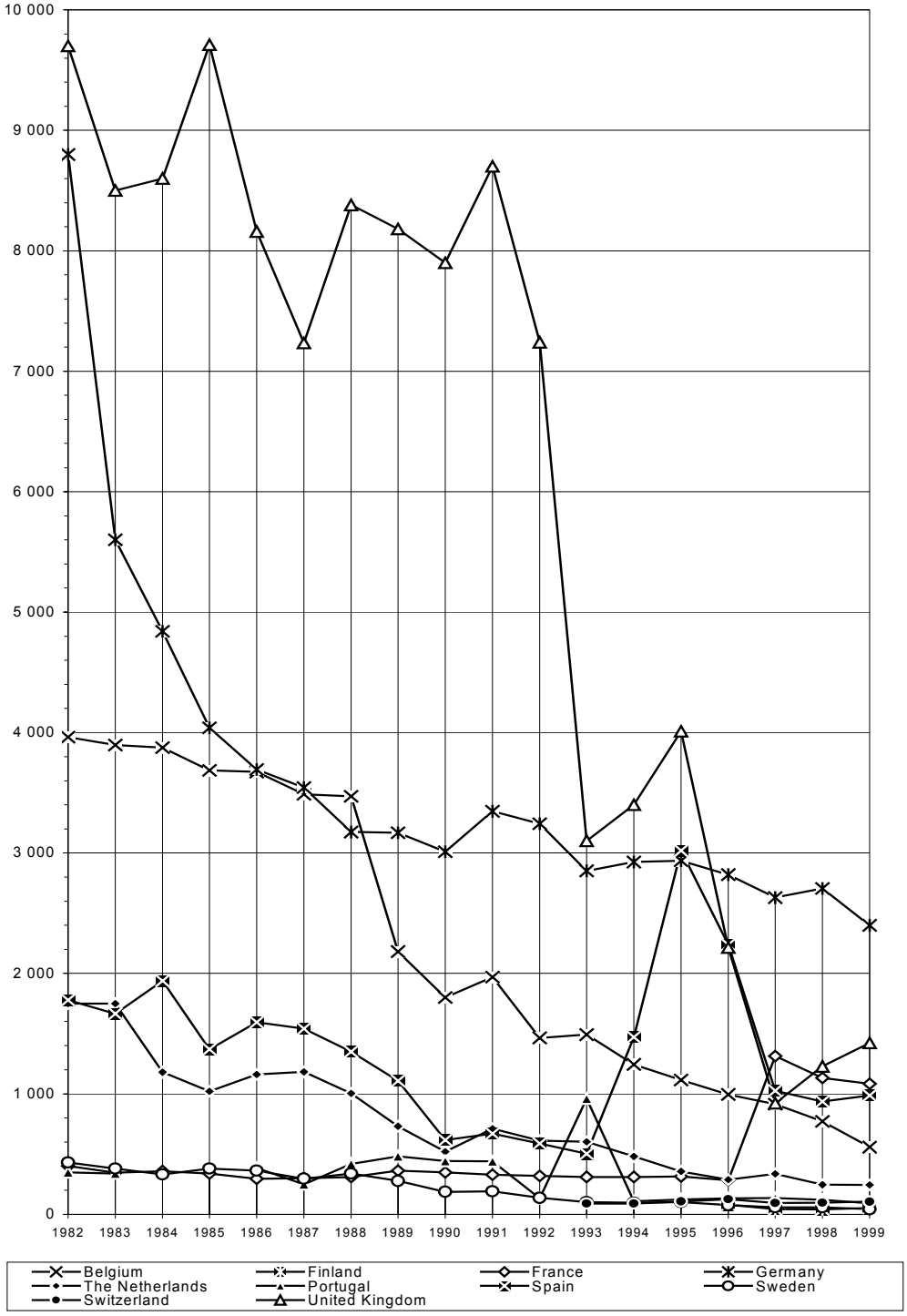


Figure 3: Atmospheric Emissions of Mercury from all plants of Contracting Parties
(in kilograms per year, all plants)

4. 1999 Data and Information

23. 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);

(iii) information about the intended future phasing out of the mercury-based chlor alkali industry (provided by Contracting Parties directly);

b. Contracting Parties with mercury-free plants or without chlor alkali industry.

24. 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.

4.1 Locations of mercury-based chlor alkali plants

25. 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
Belgium		
B/1	Solvay	Lillo
B/2	Tessenderlo	Tessenderlo
B/3	BASF	Antwerpen
B/4	Solvay	Jemeppe
Finland		
SF/1	Eka Chemicals	Oulu
France		
F/1	PC de Loos	Loos
F/2	Albemarle PPC	Thann
F/3	Solvay	Tavaux
F/4	Elf Atochem	Jarrie
F/5	SPC Harbonnières	Harbonnières
F/6	Elf Atochem	Lavera
F/7	Elf Atochem	St Auban
Germany		
D/1	ECI	Bitterfeld
D/2	Bayer	Uerdingen
D/3	ECI	Ibbenburen
D/4	Bayer	Leverkusen
D/5	BASF	Ludwigshafen
D/6	ICI	Wilhelmshafen
D/7	Vestolit	Marl
D/8	Hüls	Lülsdorf
D/9	LII	Frankfurt
D/10	Bayer	Dormagen
D/11	Clariant	Gersthofen
D/12	Wacker Chemie	Burghausen
D/13	Celanese	Knapsack
D/14	Vinnolit	Gendorf
The Netherlands		
NL/1	Akzo Nobel	Hengelo
NL/2	Solvay	Linne-herten
Portugal		
P/1	Uniteca	Estarreja

Spain

E/1	Quimica del Cinca	Monzon
E/2	Hernani	Hernani
E/3	Elnosa	Lourizan
E/4	Ercros	Flix
E/5	Solvay	Torrelavega
E/6	Solvay	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

Switzerland

CH/1	Solvay	Zurzach
CH/2	Novartis	Monthey
CH/3	Säurefabrik	Pratteln

United Kingdom

UK/1	Rhodia	Staveley
UK/2	Hays	Sandbach
UK/3	ICI	Runcorn

Other Contracting Parties

Denmark

Denmark has no chlor-alkali plants.

Luxembourg

Luxembourg has no chlor-alkali plants.

Iceland

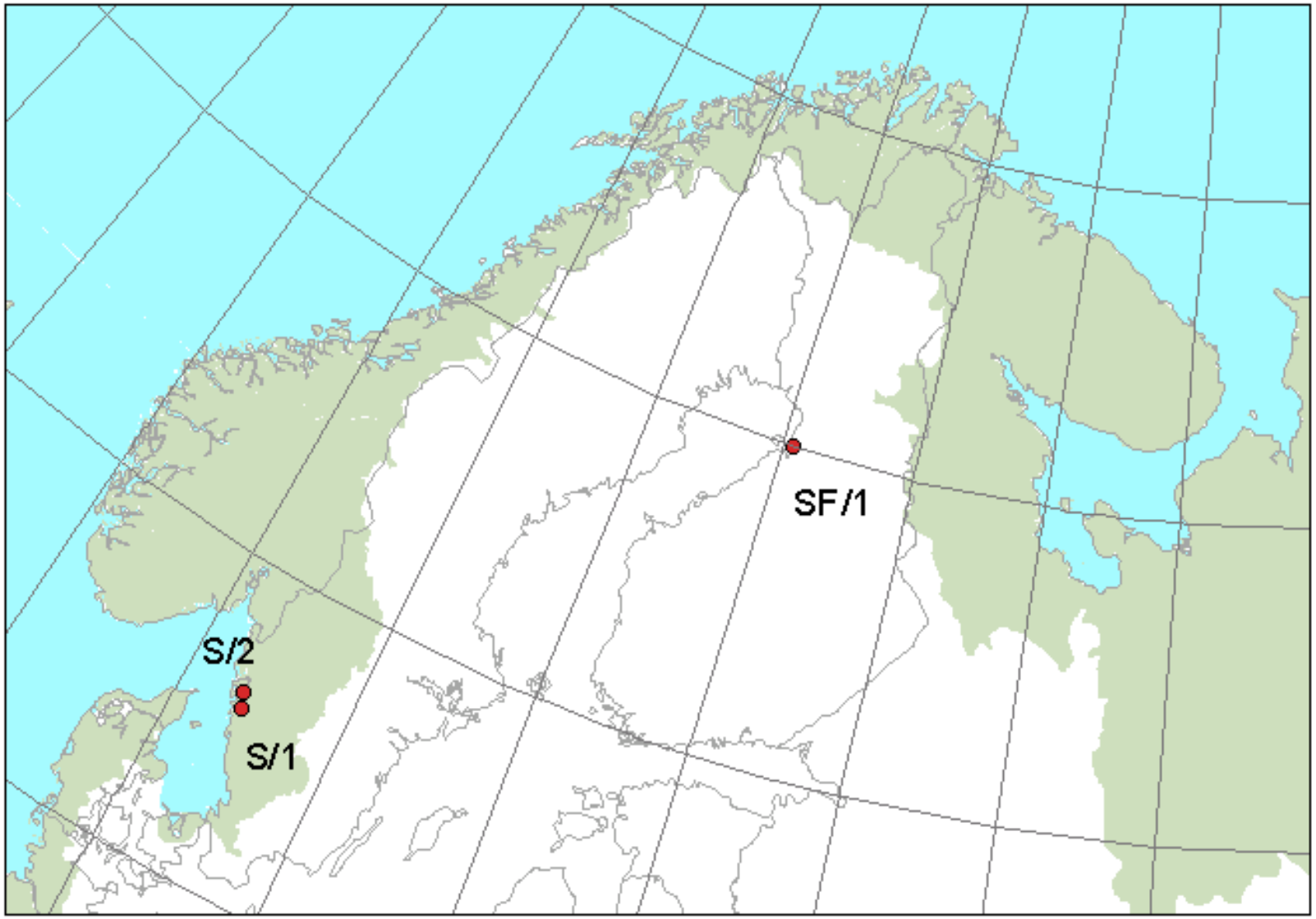
Iceland has no chlor-alkali plants.

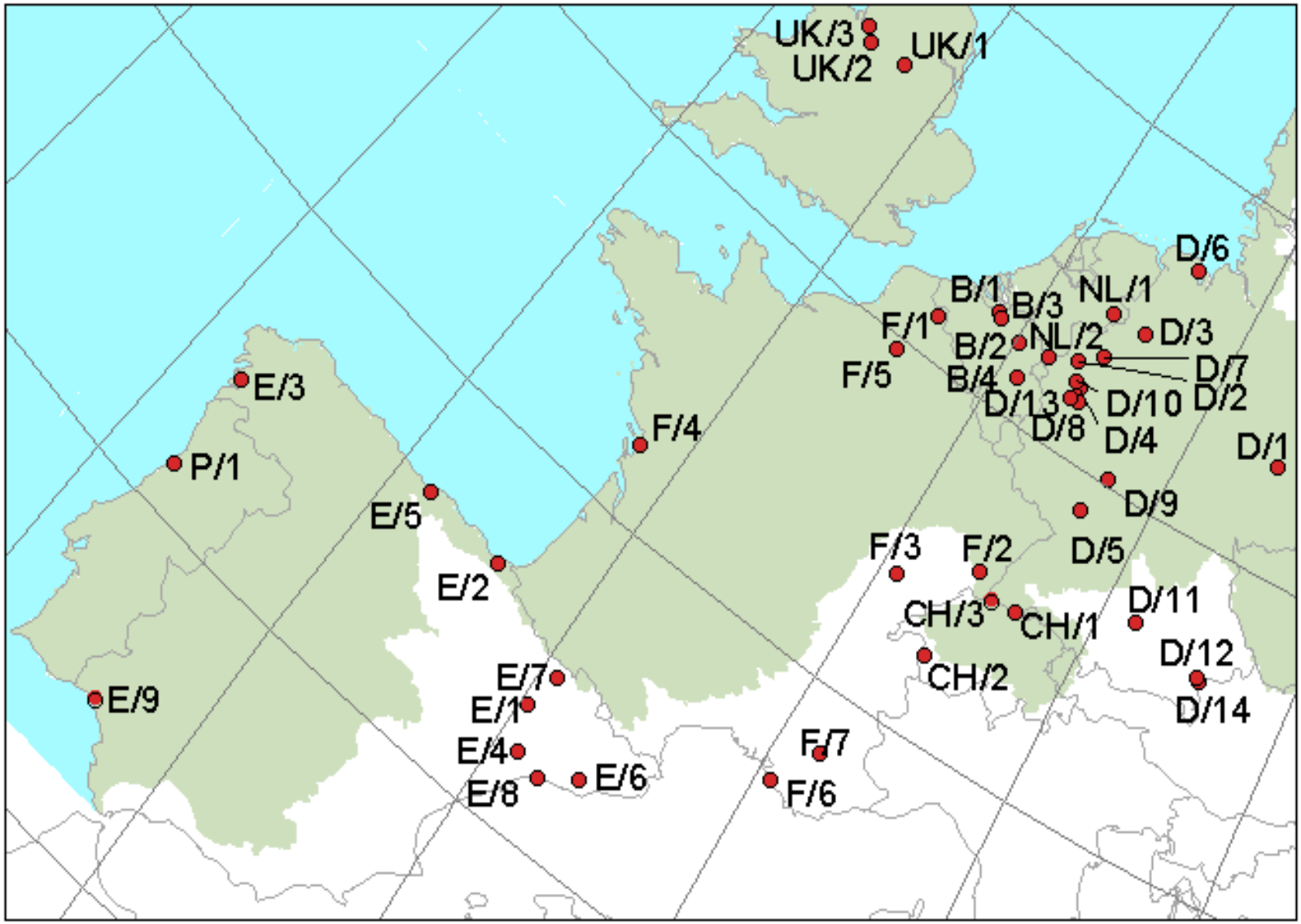
Ireland

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

Norway

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


SF/1
S/2
S/1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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	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)
B/1	230 000	A	R	30,954	0,050	0,020	0,200	0,480	0,680	0,750	3,640	0,915	4,000	0,000	22,443	4,121
B/2	250 000	A	R	16,520	0,083	0,010	0,003	0,614	0,617	0,710	22,930	0,160	-1,940	0,000	-7,120	0,000
B/3	100 000	A	R	12,279	0,049	0,063	0,013	1,000	1,013	1,125	0,025	0,000	0,000	0,000	0,000	11,129
B/4	82 000	A	R	6,300	0,050	0,280	0,190	1,590	1,780	2,110		1,164	0,000	0,000	1,160	3,030
Total	662 000															

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		Deposed 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)
SF/1	40 000	Baltic	R	112,205	0,127	0,125	0,010	1,313	1,322	1,574	0,003			0,000	8,610	102,019
Total	40 000															

Additional information:

Finland has confirmed that the mercury based production of its above plant will cease by 2010. However, there is no specific intermediate timetable

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		Deposed 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)
F/1	18 040	A	R	17,738	0,100	0,100	0,037	1,343	1,380	1,580			0,024		1,319	14,839
F/2	72 000	A	R	9,892	0,102	0,090	0,010	1,590	1,600	1,792	0,950					7,150
F/3	240 900	M	R	8,480	0,090	0,011	0,470	0,860	1,330	1,431	5,220		0,263		1,092	0,737
F/4	170 070	M	R	8,000	0,033	0,030	0,188	0,880	1,068	1,131	0,320		0,240		0,680	5,869
F/5	22 500	A	R	18,400	0,320	0,001	0,033	1,090	1,123	1,444	0,000	0,004	0,264		11,911	5,045
F/6	166 000	M	R	10,450	0,043	0,130	0,001	0,970	0,971	1,144	0,196				0,000	9,110
F/7	184 300	M	R	6,810	0,031	0,110	0,001	1,380	1,381	1,522	0,131				0,000	5,157
Total	873 810															

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		Deposed 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)
D/1	65 000	A	R	0,000	0,095	0,002	0,020	1,590	1,610	1,707	0,480	0,310			4,517	-6,704
D/2	130 000	A	R	29,240	0,080	0,008	0,030	1,010	1,040	1,128	0,030		0,030		0,214	27,868
D/3	120 000	A	R	0,000	0,080	0,004	0,003	0,319	0,322	0,406	0,014	-0,038	0,000		-0,310	-0,111
D/4	300 000	A	R	21,176	0,032	0,016	0,030	1,145	1,175	1,223	10,180				0,000	9,773
D/5	150 000	A	R	-15,625	0,030	0,010		1,700	1,700	1,740	0,440	-2,000			-12,500	-5,305
D/6	130 000	A	R	10,646	0,025	0,005	0,003	0,507	0,510	0,540	10,104		0,746	1,100	14,200	-14,198
D/7	180 000	A	R	104,396	0,060	0,010	0,030	1,640	1,670	1,740	207,000		-19,838		-109,000	4,656
D/8	98 000	A	R	-10,204	0,170	0,010	0,060	1,730	1,790	1,970	16,800	0,094	-0,200		-1,082	-27,892
D/9	150 000	A	R	73,938	0,063	0,012	0,085	0,910	0,995	1,070	15,134			9,811	57,732	0,002
D/10	248 000	A	R	0,000	0,036	0,000	0,220	1,320	1,540	1,576	1,225	-0,198	0,521		1,302	-4,104
D/11	60 000	Bl Sea	R	12,156	0,060	0,020	0,060	1,600	1,660	1,740	0,310		0,310		9,688	0,419
D/12	157 000	Bl Sea	R	2,185	0,080	0,003	0,060	0,700	0,760	0,843	1,120				0,000	0,222
D/13	150 000	A	R	50,819	0,056	0,025	0,018	0,811	0,829	0,910	17,949	2,440	2,674		31,963	-0,003
D/14	72 000	Bl Sea	R	30,223	0,040	0,020	0,030	1,300	1,330	1,390	23,000	12,880	0,280		159,796	-153,963
Total	2 010 000															

Additional information:

Timetable of the intended future phasing out of mercury-based chlor alkali production capacities in terms of percentage [1)]

Year	Production Capacity (%)
1999	100
2000	82,3
2001	69,6
2002	57,9
2003	57,9
2004	57,9
2005	51,5
2006	43,9
2007	
2008	
2009	
2010	

[1)] The data include all 14 mercury-based chlor alkali plants in Germany. Three of them are not located in the OSPAR area.

The Netherlands

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		Deposed 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)
NL/1	70 000	A	R	1,131	0,054	0,027	0,169	0,758	0,927	1,008	0,082	0,163	0,002		2,221	-2,180
NL/2	140 000	A	R	10,945	0,100	0,030	0,140	1,130	1,270	1,400	0,000				0,000	9,545
Total	210 000															

Portugal

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)		Deposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
P/1	48 000	A	R	25,404	0,500	0,300	0,300	1,600	1,900	2,700			0,650		15,012	7,693
Total	48 000															

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		Deposed 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)
E/1	30 000	M	R	52,318	0,300	0,480	0,010	1,250	1,260	2,040	42,150	0,320	-0,610		-9,085	17,214
E/2	15 000	A	R	8,100	0,200	0,490	0,010	1,320	1,330	2,020	1,800		0,012		0,810	3,470
E/3	33 500	A	R	20,342	0,440	0,020	0,010	1,500	1,510	1,970	11,460	0,001	0,005		0,179	6,733
E/4	150 000	M	R	23,667	0,330	0,130	0,010	1,440	1,450	1,910	17,960		0,401		2,673	1,123
E/5	63 000	A	W	3,666	0,762	0,055	0,160	1,282	1,442	2,259	16,085	-0,697	-1,009		-27,189	12,511
E/6	209 000	M	R	4,943	0,070	0,050	0,070	0,680	0,750	0,870	2,890				0,000	1,183
E/7	25 000	M	R	23,600	0,400	0,300	0,200	1,200	1,400	2,100	0,800	0,390			15,600	5,100
E/8	135 000	M	R	29,333	0,110	0,070	0,060	1,620	1,680	1,860	3,690	2,060			15,259	8,524
E/9	101 000	A	R	25,337	0,150	0,080	0,670	0,830	1,500	1,730	4,950	0,890			8,812	9,845
Total	761 500															

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		Deposed 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)
S/1	100 000	A	R	16,815	0,012	0,006	0,003	0,247	0,250	0,268	0,064	1,851	-0,004		17,941	-1,458
S/2	120 000	A	R	6,043	0,011	0,004	0,002	0,137	0,139	0,154	0,011	-0,784			-6,817	12,696
Total	220 000															

Additional information:

Sweden has changed an ordinance to the effect that mercury should be banned for chlor-alkali production from 2010. As a consequence of the environmental objectives of the Swedish government, Hydro Polymer in Stenungsund has incorporated the following statement in its environmental programme: *"According to the trade´s programme for sustainable development of PVC products, chlorine- and PVC-manufacturing must have switched from chlorine manufacture with the mercury method by 2010 at the latest"*

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)		Deposed off D (g/t)	Awaiting recovery c (tonnes)	Awaiting disposal f (tonnes)	Awaiting decision I (tonnes)	Temporarily stored F (g/t)	
CH/1	55 000	A	R	-8,782	0,040	0,080	0,070	1,300	1,370	1,490	3,000				0,000	-13,272
CH/2	22 000[1]	M	R	79,925	0,022	0,007	0,007	0,841	0,848	0,877					0,000	79,048
CH/3	26 500[1]	A	R	41,470	0,140	0,050		0,370	0,370	0,560	40,910				0,000	0,000
Total	103 500															

Additional information on the intended future phasing out of mercury-based chlor-alkali industry or conversion to mercury free capacities:

There are no specific plans for the phasing out or conversion of the two mercury-based plants operating in the OSPAR catchment area in Switzerland. However, both companies are signatures to the voluntary commitments (WOCAI 99/7/1, Annex 5 or POINT 99/10/Info-4) presented to POINT 1999 (POINT 99/10/7) by Euro Chlor and are willing to adhere to the fixed proposals, *inter alia*, to the timetable for emission reductions and plant closures.

[1] Compared to previous annual OSPAR reports on mercury losses from the chlor-alkali industry, the production capacities of CH/2 and CH/3 have slightly decreased due to a change in the calculation of these capacities and do not represent a real change.

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		Deposed 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/1	29 000	A	R	41,172	0,050	0,005	0,040	0,430	0,470	0,525	5,540				0,000	35,107
UK/2	89 000	A	R	120,332	0,080	0,020	0,020	1,290	1,310	1,410	0,420	9,082	-0,008		100,966	17,536
UK/3	738 000	A	W	49,749	0,040	0,210	0,150	1,600	1,750	2,000	5,300	-8,000		15,200	9,760	32,689
Total	856 000															

Annex 1

Reporting on Compliance with PARCOM Decisions and Recommendations (excluding PARCOM Decision 90/3) Concerning Mercury Cell Chlor-Alkali Plants

HSC 2001 endorsed the conclusions of POINT 2000 that all mercury-cell chlor-alkali plants operating in the OSPAR catchment area of Contracting Parties complied with the following measures:

- 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.

The attached overviews contain for each Contracting Party concerned:

Part A: Information on the means of implementation;

Part B: Technical Information from all plants operating in the OSPAR catchment area.

Appendix 1 Belgium

Appendix 2 Finland

Appendix 3 France

Appendix 4 Germany

Appendix 5 the Netherlands

Appendix 6 Portugal

Appendix 7 Spain

Appendix 8 Sweden

Appendix 9 Switzerland

Appendix 10 United Kingdom

(all data concerns 1998 except where indicated otherwise)

n.b. Denmark has no chlor-alkali plants.

Luxembourg has no chlor-alkali plants.

Iceland has no chlor-alkali plants.

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

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

Appendix 1

Part A: Information on means of implementation

Country: **BELGIUM**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **4**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**4**	**X**		
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	**0**			
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	**4**	**X**		
PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982	**0**	**X**		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	**4**	**X**		

n.b. PARCOM Measures implemented on the basis of national implementation of corresponding EC Directives

Part B: Technical information from all plants operating in the OSPAR catchment area

Country: **BELGIUM**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**4/4**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**4/4**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**4/4**	

Appendix 2

Part A: Information on means of implementation

Country:	**FINLAND**
Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes:	**0**
Base year:	**1998**

Measure	**No. of plants for which this measure is applicable**	**Implementation by means of:** legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980		**X**		
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981		**X**		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981		**X**		
PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982		**X**		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985		**X**		

n.b. The plant in Finland discharges into the HELCOM catchment area.

Part B: Technical information from all plants operating in the OSPAR catchment area

Country: **FINLAND**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**1**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**1**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**1**	

n.b. The plant in Finland discharges into the HELCOM catchment area.

Appendix 3

Part A: Information on means of implementation

Country: **FRANCE**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **3**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**3**	**X**	**X**	
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	**3**	**X**	**X**	
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	**3**	**X**	**X**	

Part B: Technical information from all plants operating in the OSPAR catchment area

Country: **FRANCE**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**7/7**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**7/7**	C
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**7/7**	A-B

n.b. 3 incidents:

A a big storm leads to the shutdown of the electrolysis and the overflowing of brine pits, which pollutes waste water pipes during 11 days (Lavera plant)

B pollution due to heavy rains 5 days - (Albemarle plant)

C technical incident 1 +(2 x 2) = 5 days - (Albemarle plant)

Appendix 4

Part A: Information on means of implementation

Country: **GERMANY**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **12**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**12**	**X**	**X**	-
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	**0**			
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	**12**	**X**	**X**	-
PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982	**0**			
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	**12**	**X**	**X**	-

n.b. ( ) means number of plants in all national catchment areas

Part B: Technical Information from all plants operating in the OSPAR catchment area (to be provided via Euro Chlor)

Country: **GERMANY**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**15/15**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**15/15**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**15/15**	

Appendix 5

Part A: Information on means of implementation

Country: **THE NETHERLANDS**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **1998: 2 2000: 1**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**2**	**X**		
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	**0**			
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	**2**	**X**		
PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982	**2**			
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	**2**	**X**		

n.b. PARCOM Measures and Council Directive 82/176/EEC were implemented by Ministerial Decree of 25 April 1986.

Part B: Technical Information from all plants operating in the OSPAR catchment area

Country: **THE NETHERLANDS**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**2/2**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**2/2**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**2/2**	

Appendix 6

Part A: Information on means of implementation

Country: **PORTUGAL**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **1**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**1**			**X**
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	**1**			**X**
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	**1**			**X**

Part B: Technical Information from all plants operating in the OSPAR catchment area

Country: **PORTUGAL**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**1/1**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**1/1**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**1/1**	

Appendix 7

Part A: Information on means of implementation

Country: **SPAIN**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **4**

Base year: **2001**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**3**	**X**		**X**
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	**1**	**X**		**X**
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	**3**	**X**		**X**
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	**3**	**X**		**X**

Part B: Technical Information from all plants operating in the OSPAR catchment area

Country: **SPAIN**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**8/8**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983	**1/1**	
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986	**1/1**	
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**8/8**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**8/8**	

Appendix 8

Part A: Information on means of implementation

Country: **SWEDEN**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **2**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**2**	**X**		
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	**0**			
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	**2**	**X**		
PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982	**2**	**X**		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	**2**	**X**		

Part B: Technical Information from all plants operating in the OSPAR catchment area

Country: **SWEDEN**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**2/2**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**2/2**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**2/2**	

Appendix 9

Part A: Information on means of implementation

Country: **SWITZERLAND**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **2**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**2**	**X**		
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	**0**			
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	**2**	**X**		
PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982	**0**			
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	**2**	**X**		

Part B: Technical Information from all plants operating in the OSPAR catchment area

Country: **SWITZERLAND**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**3/3**	
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983		
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**3/3**	
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**3/3**	

n.b. 1 of the 3 Swiss chlor-alkali plants is operating mercury-free

Appendix 10

Part A: Information on means of implementation

Country: **UNITED KINGDOM**

Number of national chlor-alkali plants in the OSPAR catchment area using mercury processes: **3**

Base year: **1998**

Measure	No. of plants for which this measure is applicable	Implementation by means of: legislation	administrative action	negotiated agreement
PARCOM Decision on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant), 1980	**2**	**X**		
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	**1**	**X**		
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	**2**	**X**		
PARCOM Decision on New Chlor-Alkali Plants Using Mercury Cells, 1982	**0**			
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	**2**	**X**		

Part B: Technical Information from all plants operating in the OSPAR catchment area

Country: **UNITED KINGDOM**

Measure	Limit Values (LVs) in Water	Entry into force	Number of national plants which complied in 1998 with the LV	Remarks
PARCOM Decision 80/2 on Limit Values for Mercury Emissions in Water from Existing and New Brine Recirculation Chloralkali Plants (exit of the purification plant)	0,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 2,0 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**2/2**	**D**
PARCOM Decision on Limit Values for Existing Waste Brine Chlor-Alkali Plants, 1981	8 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1983	**1/1**	
	5 g of mercury per metric tonne of chlorine production capacity as a monthly mean	1 July 1986	**1/1**	
PARCOM Decision on Limit Values for Existing Brine Recirculation Chlor-Alkali Plants (exit of the factory site), 1981	1,5 g of mercury per metric tonne of chlorine production capacity as a monthly mean, and 6 g of mercury per metric tonne of chlorine production capacity as a daily mean	1 July 1983	**2/2**	**D**
PARCOM Decision on New Chloralkali Plants using Mercury Cells, 1982	0,5 g of mercury per tonne of installed chlorine production capacity	1 July 1982		
PARCOM Recommendation on Limit Values for Mercury Emissions in Water from Existing Brine Recirculation Chlor-Alkali Plants (exit of factory site), 1985	0,5 g of mercury per tonne of chlorine production capacity as a monthly mean and 2 g of mercury per tonne as a daily mean	1 July 1986	**2/2**	**D**

D one day of no compliance (Staveley Plant)

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