HELSINKI COMMISSION
Baltic Marine Environment Protection Commission

The Implementation of the 1988 Ministerial Declaration on the Protection of the Marine Environment of the Baltic Sea Area with regard to Hazardous Substances.

A FINAL OVERALL CONCLUSION INCLUDING THE NEW GOALS.

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Content

0. EXECUTIVE SUMMARY

The Meeting of Ministers responsible for the environment adopted in February 1988 the Declaration on the Protection of the Marine Environment of the Baltic Sea Area. The Ministers declared their firm determination to make further provisions for reducing discharges from point sources of toxic or persistent substances, nutrients, heavy metals and hydrocarbons by construction and operation of installations and equipment in conformity with the best available technology. In this context it was noted that actions concerning non-point sources would also be needed. In order to fulfil these objectives current and new efforts on reduction of the load of pollutants should aim at a substantive reduction of the substances most harmful to the ecosystem of the Baltic Sea especially of heavy metals and toxic or persistent organic substances and, nutrients for example in the order of 50 % of the total discharges of each of them as soon as possible but not later than 1995. A complete chronology of the Implementation of the 1988 Ministerial Declaration on the Protection of the Marine Environment of the Baltic Sea Area is listed in table 1 in the Annex. The corresponding substances are listed in table 2 in the Annex.

In 1998 the HELCOM Recommendation 19/5 on the HELCOM Objective with regard to hazardous substances was adopted. The objective is to prevent pollution of the Convention Area by continuously reducing discharges, emissions and losses of hazardous substances towards the target of their cessation by the year 2020, with the ultimate aim of achieving concentrations in the environment near background values for naturally occurring substances and close to zero for man-made synthetic substances. The corresponding substances are listed in table 3 in the Annex.

But HELCOM still required the Contracting Parties to continue the work on those substances for which a 50 % reduction goal was set up by the Commission (HELCOM 12/18, Annex 6, and HELCOM 14/18, Paragraph 6.40).

With this Final Progress Report a new overall conclusion (taking into account the Progress Report of the Esbjerg Goal, 1995) has now been elaborated, focussing on the reduction results, trends and data gaps as well as on the experience from that approach and the reasons for the problems encountered.

The data submitted by the Contracting Parties are structured country by country in alphabetical order (chapter 3).

The learning points with regard to a substance specific reduction target are discussed in detail focussing especially on the reporting format, the calculation methods, the availability and comparability of data, the resources devoted to this approach, and the question, whether such an approach serves the needs of sustainability (chapter 4).

The available data mostly do not allow a final quantitative judgement whether or not the reduction goal of 50 % was reached. So the tables 6 and 7 in the Annex provide only an overview and a rough estimation. However, by using more qualitative information (chapter 5) it might be possible to evaluate to which extent the 50 % target has been reached.

For example, deep socio-economic changes since 1989 in the Baltic countries, Russia and Poland led to a significant decrease in agricultural output and industrial production and thus decreasing emissions and discharges. However, with growing economy also use and/or emissions of hazardous substances may increase again. And nevertheless, in economies in transition the emission of certain hazardous substances may also have increased despite the fact that the

overall industrial and agricultural activity went down. Such substances need careful observation under the new long-term objective, the cessation target.

For some substances both the socio-economic development nor reduction programs and investment in wastewater technology influences the releases to the environment. This is for example the case for diffuse sources of metals and releases of PCB from equipment and waste. Evaluating these releases as a basis to set up reduction measures needs very particular approaches.

Based on these considerations in combination with some of the data given it may be concluded that is very likely that the 50 % target has been reached for most of the substances. However, specific substances in specific applications need further attention. This can be established based on current knowledge and does not need further data collection exercises. Also, knowledge of exact figures on the development between 1988 and 1998 is not needed to cease the remaining emissions, losses and discharges of the hazardous substances listed in table 6.

Overall conclusion

Based on the information compiled in this report and the learning points addressed the following main conclusions can be drawn:

- The 50 % reduction goal can be taken as largely reached. This conclusion is partly based on substances specific data on release and occurrence, and on the general assumption made under chapter 5.

- Those substances, which are still of concern should be dealt with under the HELCOM Hazardous Substances Strategy (cessation goal).

- Target setting should include in future more careful considerations on the right indicators to measure progress and the methods to obtain data necessary to work with such indicators.

- The focus for the future work should be on practical reduction measures, administrative capacity and industry efforts needed for implementation.

- The 50 % target has now been replaced by the cessation target with regard to certain hazardous substances. This will be the guiding objective for the further work.

1. INTRODUCTION

1.1 The Ministerial Meeting February 1988. The Declaration on the Protection of the Marine Environment of the Baltic Sea Area and the 50 % reduction goal.

Within the work of the Helsinki Commission, the Baltic Marine Environment Protection Commission (HELCOM), the main marine pollution problems had, by 1988, certainly been identified. The extent of the anthropogenic impact on the Baltic Sea was alarming. So the Meeting of Ministers responsible for the environment adopted in February 1988 the Declaration on the Protection of the Marine Environment of the Baltic Sea Area.

The Ministers declared their firm determination to make further provisions for reducing discharges from point sources of toxic or persistent substances, nutrients, heavy metals and hydrocarbons by construction and operation of installations and equipment in conformity with the best available technology. In this context it was noted that actions concerning non-point sources would also be needed. In order to fulfil these objectives current and new efforts on reduction of the load of pollutants should aim at a substantive reduction of the substances most harmful to the ecosystem of the Baltic Sea especially of

- heavy metals and toxic or persistent organic substances and,
- nutrients

for example in the order of 50 % of the total discharges of each of them as soon as possible but not later than 1995.

The work started under the HELCOM Technological Committee, which endorsed during its 1st Meeting in October 1990 the "Draft Baltic Sea list of priority harmful substances other than nutrients for immediate action in order to reach the 50 % reduction goal by 1995". The Commission Meeting 1991 adopted this list (HELCOM 12/18, Annex 6, 1991); the Commission Meeting 1993 endorsed the inclusion of lindane to the priority list (HELCOM 14/18, Paragraph 6.40, 1993) (see table 2 in the Annex).

A complete chronology of the Implementation of the 1988 Ministerial Declaration on the Protection of the Marine Environment of the Baltic Sea Area is listed in table 1 in the Annex.

The Commission Meeting already recognized the first difficulties with regard to progress in 1991. The input data reported by Contracting Parties (CP) varied in many aspects with regards to e.g. sampling and analytical methods as well as methods of calculation applied. Due to that reason it was not possible to make any calculation concerning the 1987 total amount of the inputs for specific pollutants or to compare data from different countries.

An interim report submitted to the Ministerial HELCOM Meeting (HELCOM 15) in 1994 again revealed only few promising achievements in implementing the 50 % reduction goal.

The Final Report on the Implementation of the 1988 Ministerial Declaration, published as the "Baltic Sea Environment Proceedings No. 71", was submitted to the Ministerial HELCOM Meeting (HELCOM 19) in 1998. The Commission concluded that, despite all the efforts by CP, the overall or nation-wide 50 % reduction target has not been reached for all polluting inputs to the extent called for in 1988.

But the Commission also reaffirmed the commitment of the Contracting Parties to the strategic goals set up in the 1988 Ministerial Declaration and decided to further the progress by defining more specific targets, aimed at most cost effective solutions, to be implemented not later than 2005 and reviewed provisionally in 2003.

The Commission further adopted the HELCOM Recommendation 19/5 on the HELCOM Objective with Regard to Hazardous Substances. The Recommendation recalls, *inter alia*, the Kalmar Communiqué of the Council of the Baltic Sea States, 1996, which stated that the uncontrolled use and handling of chemicals, including pesticides, require special attention, and called for the development by the Helsinki Commission of an Action Programme to ensure that discharges, emissions and losses of hazardous substances will be continuously reduced towards the target of their cessation within one generation (25 years), with the ultimate aim of achieving concentrations in the environment near background values for naturally occurring substances and close to zero concentrations for man-made synthetic substances.

"Hazardous" substances are defined as follows:

> (i) substances or groups of substances that are toxic, persistent and liable to bioaccumulate;
>
> (ii) other substances or groups of substances which are agreed by the Commission as requiring a similar approach as the substances referred to in (i) even if they do not meet all the criteria for toxicity, persistence and bioaccumulation, but which also give grounds for concern

A Strategy to implement the HELCOM Objective with regard to hazardous substances was attached to Recommendation 19/5. The Project Team for the implementation, consisting of representatives from the Contracting Parties, CEFIC, EuroChlor and WWF was established. Its work should include *inter alia* the identification of sources, pathways and fate of hazardous substances and the initiation and promotion of the development of different policy instruments to take into account phasing out, substitution and/or minimised use and reduction of discharges of hazardous substances. The work should start with selected substances as set out in Appendix 3 of the HELCOM Recommendation 19/5 (see table 3 in the Annex). But HELCOM still required the Contracting Parties to continue the work on those substances for which a 50 % reduction goal was set up by the Commission (HELCOM 12/18, Annex 6, and HELCOM 14/18, Paragraph 6.40), as included in list 1, Appendix 2.

At its 1st Meeting the Project Team decided on a pilot programme to gather information on selected priority substances (see table 4 in the Annex) with regard to

- the assessment of the effectiveness of the implementation of the 1988 Ministerial Declaration and the reason for the problems encountered and
- the implementation of the HELCOM Objective

At its 3rd Meeting in January 2000 the Project Team noted in the first assessment of data supplied by a questionnaire that these data were very insufficient for the intended calculations. The Contracting Parties were requested to review and improve the submitted information.

The 3rd Meeting of the Heads of Delegation in August 2000 took note of the Progress Report of the Project Team for the Implementation of the HELCOM Objective with Regard to Hazardous Substances (HELCOM HOD 3/2000, 3/8) (LD 4). The Meeting further took note of the current situation and the problems the Project Team on Hazardous Substances is facing and adopted the proposal to use the data submitted for the late 90`s as a new basis for calculation and to define new milestones. The Meeting further decided that a final report concerning positive as well as negative results of the 50 % reduction goal will be submitted and the future work should focus on measures to reduce and phase-out hazardous substances taking into consideration the relevant work within EU and OSPAR (LD 5).

At its 4th Meeting in October 2000 the Coordinator presented an analysis of the reviewed information given by the Contracting Parties. The Project Team noted that the data situation had not been much improved. However, most of the pesticides on the list for immediate priority action are not in use. After inclusion of some outstanding information and results about stockpiles a pesticide report will be published, indicating, whether the 50 % reduction goal or even the cessation goal has been reached.

Since there is no common baseline defining the starting point of reduction a direct comparison between the Contracting Parties is not possible. However, the question is, whether it would make sense to do so. One has to keep in mind that the Ministerial Declaration concerning the 50 % reduction goal was adopted in 1988, in a kind of emergency case, when the extent of the anthropogenic impact on the Baltic Sea was alarming. Today, more than 10 years later, the crucial point is, that efforts have to be undertaken to continuously reduce discharges, emissions and losses of hazardous substances because it is the agreed long term objective that concentrations of hazardous substances in the environment should be near to background values for naturally occurring substances (like e.g. heavy metals) and close to zero for man-made synthetic substances. A reduction of 50 %, which reminds very much on an "end-of-the-pipe"-solution can only be the first step in this direction. But a sustainable reduction has to apply the precautionary principle, that is to avoid discharges etc. rather than to reduce them, to substitute hazardous substances by less or non-hazardous substances rather than to use them in amounts of 50 %. Instead of focussing on harmonized calculation methods all efforts should be put on the development of cost-effective measures for the continuous phasing-out of discharges, emissions and losses of hazardous substances towards their cessation.

Finally, with this Progress Report a new overall conclusion (taking into account the Progress Report of the Esbjerg Goal, 1995) has been elaborated, focussing on the reduction results, trends and data gaps as well as on the experience from that approach and the reasons for the problems encountered.

2. THE REPORTING METHOD

Currently, different methods are applied to show progress in reaching various reduction goals. Since the countries involved might be totally different with regard to economic and political structures, it seems obvious, that a harmonized and feasible method able to report sufficiently on such a goal does not exist.

2.1 The HELCOM reporting methods

The responsibility to provide data reporting the progress of the 50 % reduction goal was given to every Contracting Party to the Helsinki Commission.

In order to be able to report on the implementation of the Ministerial Declaration, the Working Group on Criteria and Standards for Discharges of Harmful Substances to the Baltic Sea (WGS) developed in 1990, on the basis of the conclusions of the Second Periodic Assessment and available environmental knowledge, "The Principles for National Programmes to achieve the 50 % reduction goal". But the input data reported by Contracting Parties varied nevertheless in many aspects with regards to e.g. sampling and analytical methods as well as methods of calculation applied.

In 1995, a guide on the content of national reports on measures to reduce heavy metals and persistent organic pollutants (POP) was adopted. Data were received by different pollution load

compilations, air emission inventories and the Third Periodic Assessment. But based on the scarce and incomplete available information and figures, it was again not possible to draw any conclusions on reduction figures between 1987 and 1995.

A strategy to implement the HELCOM Objective with Regard to Hazardous Substances was attached to Recommendation 19/5. The Commission also recommended that Governments should apply that strategy as a basis for the implementation. That "strategy" gave no advise on how to report but required to establish an appropriate reporting system taking into account the experiences made during this process.

Therefore, the Project Team developed a questionnaire in an electronic file format, in order to put the received information in an ACCESS database. However, as the data submitted varied substantially with regard to calculation methods, reporting years etc. (see chapter 3) the development of the ACCESS database was delayed. The questionnaire was sent out to the Contracting Parties, which were supposed to report before the end of 1999 available data on the amount of production, industrial and consumer uses and changes in the discharges, emissions and losses of these substances in the catchment area,

- for the late 1980ies
- for the late 1990ies
- planned measures and activities for implementation

The discharges, emissions and losses should be given as national figures. Table 5 in the Annex lists the questions, which were asked.

2.2 The reporting methods of the North Sea States

During the 4th International Conference on the Protection of the North Sea in 1995 the Ministers responsible for the protection of the environments agreed on several priority issues to be addressed, e.g. the prevention of pollution by hazardous substances in order to ensure a sustainable, sound and healthy North Sea ecosystem (Esbjerg Declaration).

The responsibility of providing implementation reports was given to each individual North Sea State in general, and to competent international bodies. There was no existing harmonized procedure for collecting or reporting the data. Furthermore, they lacked a common, harmonized methodology on which to calculate discharges from point and diffuse sources (including atmospheric emissions), as well as for assessing inputs to the North Sea. Thus, the North Sea States have used different approaches for estimating reductions in inputs of substances from the various sources. As a result, difficulties arose when making direct comparisons between the different North Sea States or when applying extrapolation and modelling methodologies for assessing inputs (Danish EPA 1995).

The reporting on discharges, emissions and losses of hazardous substances to the 4th North Sea Conference highlighted the need for increased harmonisation regarding definitions of sources and transparency, as well as harmonisation in the quantification of these discharges/emissions/losses of hazardous substances. Thus, the project on Harmonised Quantification and Reporting Procedures for Hazardous Substances (HARP-HAZ) was initiated. In co-operation with the European Commission and the European Environmental Agency, Norway was invited to offer its services as lead country within OSPAR, to promote and co-ordinate the necessary reporting systems and procedures, as a basis for transparent, reliable and comparable reports, including relevant sources, basic figures, calculation methods and emission factors. The HARP-HAZ work has resulted in a general description of approaches and principles of quantification methods (Overall HARP-HAZ Guidance document) and separate Guidance documents for 11 selected hazardous substances. The first version of the system is tested out through the reporting on

hazardous substances to the 5th North Sea Conference. The aim is that the HARP-HAZ Guidance documents would be of use in other international fora where reporting requirements are being developed or revised. Generally, two basic approaches are being used in quantification of pollution: The Source Orientated Approach, which focuses on the discharges, emissions and losses to water and air at the source and the Load Orientated Approach, which focuses on the total quantity of a substance that enters the maritime area (riverine input and direct discharges). The data collection as such will be carried out with the help of an Electronic Reporting Application (HARP-HAZ homepage).

3. THE OUTCOME

In the following chapter the data submitted by the Contracting Parties are structured country by country (in alphabetical order) with regard to:

data — indicating, for which substances data where submitted (extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) and the 50 % reduction list (Annex 6, HELCOM 12/18))

calculation — indicating, on which basis the calculation of a possible reduction was made (consumption figures, sales figures, estimation of consumption according to notification volumes, emission inventory, discharges, emissions and losses from point and/or diffuse sources etc.)

years — years, for which data exist or which were taken as calculation basis

results — reduction results [%] reached by which means (measures)

trends — trends, proved or assumed due to applied or intended measures

data gaps — data, which for various reasons were not submitted

The tables 6 and 7 in the Annex give an overview and a rough estimation whether the 50 % reduction goal has been reached by the Contracting Parties for the substances on the 50 % reduction list (HELCOM 12/18, Annex 6, 1991) (Tab. 6) and for the substances selected from the Rec. 19/5, Attachment, Appendix 3 list for immediate priority action (Tab. 7).

3.1 Denmark

Data — Denmark reported on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) and partly on the 50 % reduction list (Annex 6, HELCOM 12/18).

Calculation — Consumption figures, sales figures (simazine, fenitrothion, malathion), estimation of consumption according to notification volumes (SCCP, NP/NPE), background air concentrations (heavy metals), estimated consumption and total losses (cadmium), estimated total loss (lead), discharges, emissions and losses from point and diffuse sources (mercury), consumption (organotin compounds).

Years — 1989/1999 (biocides), 1990/1996 (cadmium), 1985/1994/1998 (lead), 1982/1992 & 1987/1997 (mercury), 1989/1999 (air concentration heavy metals), 1992 (copper), 1992/1993 (nickel), 1994 (organotin compounds), early 90ies/late 90ies (SCCP).

Results

Pesticides and Biocides

The 50 % reduction goal of pesticides (Appendix 3 of Rec. 19/5) emission to water is regarded to be fulfilled since none of them are approved for use anymore or have been banned. Pesticides from the 50 % reduction list (Annex 6, HELCOM 12/18) are prohibited or not used except simazine, fenitrothion, and malathion. Copper compounds are allowed in antifouling and wood treatment. Consumption of simazine and malathion was reduced (1989/1999), for fenitrothion no sales figures for 1999 are available.

Metals and their compounds

The 50 % reduction goal of cadmium emission to water is regarded to be fulfilled due to decreasing air deposition (quantities from the production of iron and steel, the fragmentation of scrap and the direct deposition has decreased), cessation of phosphoric acid production, less cadmium impurity in zinc and substitution of zinc gutter with PVC gutter, serious reduction of emissions from the refuse incineration plants and the production of iron and steel, the effectiveness of the legislation concerning the maximum content of cadmium in fertiliser, the ban of use of cadmium for certain applications and products. A reduction of background air concentration about 12 % between 1989 and 1999 for cadmium is reported without mentioning any means.

The 50 % reduction goal of lead emission to water and to air is regarded to be fulfilled due to legislative restraints, discharging licenses, and improved cleaning technology, substitution of lead additives to petrol and catalytic converters in cars, and reduced emissions from solid waste incineration, power plant, battery production, and burning of waste oils. Discharge to aquatic environment was reduced mainly as a result of the ban of use of lead shot in wetlands and improved treatment of wastewater.

The 50 % reduction goal of mercury emission to water and to air is regarded to be fulfilled due to reduced consumption of mercury with batteries and thus reduced emission form incineration plants. Mercury is generally prohibited with exemptions (dental use of amalgam in molar teeth, batteries, electrolysis, some electric equipment and specialized technical equipment). All dental clinics are equipped with filters that partly retain particles containing mercury form the clinics sucking system, sinks and thus the sewage system. The regulations of the different industrial installations (the permits) include the discharging license as an integral part of the permit.

For selenium/compounds there is no information available. It is assumed that there is no use of organic selenium compounds as biocides.

A reduction of background air concentration > 50 % between 1989 and 1999 for zinc, arsenic, and chromium is reported without mentioning any means.

The main sources of copper emissions to air in 1992 were casting, energy production and waste incineration (2 - 7 t/a). A reduction of background air concentration between 1989 and 1999 for copper (36 %) is reported without mentioning any means. Main emissions to water arose from antifouling paint, discharge of wastewater and storm water (40 - 80 t/a). The emission from WWTP in 1999 is estimated to 5.5 tons. The consumption of copper wire has probably decreased due to substitution of copper with aluminium for electric conductors and substitution of copper wires with fibre-optic cables for telecommunication.

The main sources of nickel emissions to air in 1992/1993 were energy production and waste incineration (23 – 54 t/a]. Main emissions to water arose from discharge of wastewater and storm water (14 – 15 t/a). A reduction of background air

concentration between 1989 and 1999 for nickel (32 %) is reported without mentioning any means.

Organic substances other than biocides

The emission, discharges and losses of SCCP are reduced due to a voluntary agreement between the Danish EPA and the PVC-industry in 1991. Discharging licenses have to be granted. Another source of reduction are the main metal processing industries. The consumption of SCCP in the early 90ies was approx. 75 t/y, in the late 90ies approx. 23 t/y (20 t lubricants and cutting fluids; 3 t other application areas). Thus the consumption was reduced by 69 %.

The emission, discharges and losses of nonylphenol and nonylphenolethoxylates are probably reduced to a relative low level due to voluntary agreements with the trade association SPT (Association of Danish Cosmetics, Toiletries, Soap and Detergent Industries) and pesticide industry (no pesticide containing NPE will be approved). The regulations of the different industrial installations (the permits) include the discharging license as an integral part of the permit.

The emission, discharges and losses of PCB are assumed to be reduced compared to the late eighties due to prohibition of any new use since 1986. PCB was not detected/under detection limit in wastewater outlet, examined in 1993.

For organotin compounds reduction calculations are not available. A substance flow analyses indicates that the main consumption of organotin compounds in 1994 was with PVC and antifouling paint.

Trends

The total cadmium consumption is stagnant. There was a significant increased supply of closed nickel-cadmium batteries in 1996, and a reduction of cadmium with plastic and in fertilisers. For a series of applications lithium-ion batteries or batteries based on nickel-metal-hydride are replacing the nickel-cadmium batteries. A tax on NiCd batteries and a bonus system on collection of NiCd batteries will further reduce the entry of cadmium in the environment. A new type of zinc sacrificial anode with tin and indium instead of cadmium is being patented. If this type of anode gains a footing, the cadmium load on the marine environment will be reduced by 0.6 t cadmium annually. Cadmium is on the signal list of undesirable substances.

The total lead consumption is stagnant. Prohibition of import, marketing and production of products containing metallic lead or lead compounds was issued by the end of 2000. Concerning metallic lead the prohibition will cover a list of products. The prohibitions will come into force in the period 2001-2002. Concerning lead compounds it will be a general prohibition with exemptions. The exemptions are either 'for ever' or for a limited number of years. Catalytic converters are mandatory in new cars i.e. no use of leaded fuels.

The regulation on mercury use established in 1994, will without doubt enhance further reduction of consumption.

The mass balance analyses do not predict a trend in the emission of copper, because the volume of some uses is increasing, while other uses are decreasing. The consumption of copper with pressure impregnation chemicals and with fertilizers is expected to decrease while the supply of copper with chemical compounds seems to increase.

There are no existing restrictions on the use or production of chlorinated paraffins but the use of SCCP is very limited. Denmark is awaiting the new EU Directive on chlorinated paraffins. A draft amendment of Directive 76/769/EEC is currently being discussed. It is uncertain when it will be decided.

Two projects have been initiated concerning development of substitutes for nonylphenol/nonylphenolethoxylates in insulation materials and in paints, lacquer and varnishes under the Product-orientated Environmental Initiative. The project results will be published in the beginning of 2002. Preliminary results indicate that there are qualified alternatives available to be used in paints.

Larger installations containing PCB should be out of use by 1 January 2000. Other products containing PCB should be disposed properly at end of technical lifetime. Regulations are effective but PCB is still of concern in small units.

A decline in the TBT (organotin compound) emission from antifouling is expected in 2003, due to IMO regulation. Use of organotin compounds in paints for ship hulls larger than 25 m is continued. Internationally the Danish Environmental Protection Agency is working at the convention prohibiting use of organotin in paints by 2003 and prohibiting the presence of paints containing organotin on ship hulls by 2008.

Data gaps No information on emissions, discharges and losses of industrial chemicals in the late 80ies make it impossible to really calculate the reduction goal. No systematic information on stockpiling of PCB containing products (e.g. construction material, PVC cables etc.). No information concerning approval as pesticide available for carbontetrachloride, chlorpicrin, 1,2-dichloroethane and zinc-compounds. There are no comparable consumption figures of NP/NPE for the late 80ies and the late 90ies available.

3.2 Estonia

Data Estonia reported on the pesticides of the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) and on the heavy metals lead, mercury and cadmium. Some general remarks were given for PCB, dioxins and furans.

Calculation no figures, total emissions into air 1990 - 1999 (heavy metals), use and residual stock of heavy metals by industrial enterprises 1995 – 1999, generation of waste of heavy metals in enterprises 1995 - 1999, heavy metal levels in the ecosystem of the Baltic Sea 1988 – 1998 (various publications)

Years 1975/1999 (chlorinated pesticides), 1990 - 1999 (heavy metals)

Results

Pesticides and Biocides

The 50 % reduction goal is probably fulfilled for those pesticides, which were banned in 1967 (aldrin, chlordane, DDT, dieldrin, endrin, HCH, heptachlor, lindane, mirex, and toxaphene). The remaining pesticides were banned in 1999 (except beta-HCH) for import, export and use. The use of cadmium-, lead-, selenium- and mercury-compounds as pesticides is also banned. The current amount of accumulated old stocks of pesticides is 600 t, among them 6 t DDT, 77 t mercury products and 3 t HCH products (e.g. lindane, fentiram, pentathiuram). 85 t are not yet identified.

Metals and their compounds

The anthropogenic annual emissions of lead, cadmium and mercury decreased from 1990 to 1999 by more than 50 %. This might be due to the declining use of heavy metals (especially lead and cadmium) in industrial enterprises. At the same time the residual stocks and waste of lead increased considerably.

Organic substances other than biocides

Emissions of PCDD/Fs decreased considerably. This is due to a decreasing production of electric energy and the renewal/installation of filters e.g. in cement industry and Baltic Thermal Power Plants. The largest sources of PCDD/PCDF releases to the environment in the world are waste incineration (69 % of the total emissions in 1995), iron and steel (10 %) and non-ferrous metals (8 %) industry, etc. Estonia has no such waste incineration facilities.

Trends

The requirements of the PCB Directive are transposed into two Estonian legal acts. Ongoing and proposed PCB inventories, covering 500 – 1000 enterprises and efforts to further implement the PCB Directive will probably lead to a reduction of PCB emission. This trend is e.g. supported by the data of the 4th Periodic Assessment of the State of the Marine Environment of the Baltic Sea (2001), covering the years 1994 - 1998, showing lower concentrations (compared to 1989 - 1993) of PCB in herring muscle tissue in Estonian coastal waters than in previous monitoring sessions.

Within the National Environmental Strategy for Estonia (NES) and a detailed National Environmental Action Plan (NEAP) short, medium and long-term objectives/targets to be achieved by 2000, 2005 and 2010 have been identified. They include Promotion of Clean Technologies, Reduction of environmental impacts of Energy Sector, Improvement of Air Quality including reduction of transport emissions, Improvement of Waste Management, reduction of waste generation, stimulation of recycling. These policy plans should *inter alia* help to reduce dioxin emissions.

Data gaps

Lacking information on emissions, discharges and losses, production-, sales- or consumption volumes for the organic substances, the heavy metals and most of the biocides and pesticides in the late 80ies and the late 90ies make it impossible to calculate the reduction goal.

3.3 Finland

Data

Finland reported on the 50 % reduction list (Annex 6, HELCOM 12/18) and on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5).

Calculation

Sales figures (azinphos-methyl, endosulfan, malathion, simazine, trifluralin, wood preservatives), total emissions into air (heavy metals), emissions from industries

into water (heavy metals), discharges from the municipal sewage plants (cadmium, lead, mercury), total release to the environment (cadmium)

Years 1987/1999 (pesticides, biocides), 1994/1999 (arsenic, copper, chromium compounds), 1987/1998 (organotin compounds), 1994 (NP/NPE), 1988/1997 (SCCP), 1989/1995 (carbontetrachloride), 1988/1996 (chloroform), 1996 (dichloroethane), 1989/1996 (tetrachloroethylene), 1989/1998 (1,1,1-trichloroethane), 1989/1996 (trichloroethylene), 1987/1995/1999 (AOX), 1990/1997 (reduction of metal emissions into air), 1987/1999 (reduction of metal emission into water), 1987 (cadmium)

Results

Pesticides and Biocides

The 50 % reduction goal for the pesticides of the 50 % reduction list (Annex 6, HELCOM 12/18) is regarded to be fulfilled since (with some exceptions) they have never been registered or used or due to bans or voluntary withdrawals. The same applies for the pesticides of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5). Five of the pesticides mentioned in Annex 6, HELCOM 12/18 are still in use. According to the sales figures the amount of endosulfan and simazine sold has decreased over 50 % (1987 compared to 1999). Certain uses of simazine have been voluntarily withdrawn by the registrant during the period 1987 - 1999. There is no reduction in the sales figures of trifluralin, malathion and azinphos-methyl.

The sales figures for arsenic, copper and chromium compounds used as wood preservatives have increased between 1994 and 1999 although the use of As and Cr has been restricted. Copper compounds have replaced the organotin compounds in antifouling paints for small vessels and thus the use of copper has increased.

The sale of organotin compounds has decreased about 44 % (1987 to 1998) probably due to its ban in vessels of a length under 25 metres.

The production of PCP ceased in 1984 by voluntary agreement and the use for wood preservation in 1988. As the biggest releases will occur during the treatment of wood and the first years of the use of treated wood, it is evident that discharges of PCP have reduced far more than 50 % since 1987.

Metals and their compounds

The 50 % reduction goal is achieved for arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc (1990 to 1997) regarding total metal emissions into air, metal emissions from industries into waters and metal discharges from the municipal sewage plants situated on the coast of the Baltic Sea. There are no data available on diffuse emissions of heavy metals (e.g. from the use of products containing heavy metals, from waste landfill areas) into the Baltic Sea. Compared to the other metals the rather poor decrease of chromium emissions to the atmosphere (only 41 %) despite increased pollution control measures is mainly due to significant increase of production.

The reduction of cadmium is due to the effectiveness of the legislation concerning the maximum content of cadmium in fertiliser, legislation concerning cadmium concentration in exhaust gases of incineration plants, the ban of use of cadmium for certain applications and products (e.g. stabilizer, colour etc.) and the substitution of NiCd batteries by NiMH and Li-ion batteries. Specific discharge limit values have been set for various industries.

Emission of lead from point and diffuse sources to air was reduced about 95 % during the 1990ies (116.3 t in 1990 and 15.7 t in 1998). The use of unleaded petrol has had the greatest influence on this high reduction percentage. Emissions to air from metals industry processes have reduced by about 90 % (1990 - 1997). Estimated annual point source emission of Pb to air is about 12 tonnes in the year 1997. The further reduction of lead is due to prohibition of use of lead sulphates, lead carbonate and lead hydrocarbonate in paints (with exceptions), prohibition of lead bullets in bear hunting and in waterfowl hunting, restrictions in lead content in gasoline and fertilisers, higher taxes of leaded fuel, legislation concerning lead concentration in exhaust gases of incineration plants, reduction of emissions from metal industry. Discharges into waters have to be permitted. Direct and indirect releases into groundwater are prohibited. Discharges to water from industrial sources declined about 83 % (1653 t in 1994 and 284 t in1998).

In 1987 the total emission of mercury was estimated to be about 10 tons/year. In 1992 the estimated total emissions had decreased to about 6 tons. The further reduction of mercury is probably due to prohibition of use as antifouling, wood preservative, prohibition of use in plant protection products and for impregnation of textiles and yarn, treatment of industrial waters and restrictions concerning mercury content in batteries, legislation concerning mercury concentration in exhaust gases of incineration plants. Specific discharge limit values have been given for certain industries. Direct and indirect releases into groundwater are prohibited. The amalgam separator in dental clinics must have an efficiency of at least 95 %.

Organic substances other than biocides

The used amounts of SCCP decreased about 97 % between 1988 (840 t) and 1997 (27 t) due to the breakdown of uses in paper-, paint-, metal-, textile- and rubber-industry.

The amounts of nonylphenol/nonylphenolethoxylates used, especially for industrial cleaning and in pesticides, have declined since 1994 (730 t) due to information provided for the industry and the users. Breakdown of use mainly happened in chemical-, paper- paint and pesticide-industry. However, data for the late 1990ies are not available.

The emission, discharges and losses of PCB are assumed to be reduced compared to the late eighties due to voluntary cessation during the 70ies, the prohibition of any new uses since 1989 and the obligation to take out of use and destruct the remaining PCB equipment. PCB emissions to the air in 1995 were estimated to be 550 kg. The bulk deposition of PCB is an order of magnitude higher than could be expected on the basis of the estimated emissions, partly due to long-range transport of PCB. In general, emissions of PCB are difficult to assess.

The imported amounts of carbontetrachloride decreased about 98 % between 1989 and 1995.

The used amounts of chloroform decreased about 40 % between 1988 and 1996.

The used amounts of trichloroethylene increased about 13 % between 1989 and 1996. The most important users are rubber, plastic and metal industry.

The used amounts of tetrachloroethylene decreased about 50 % between 1989 and 1996 probably due to decreased uses in dry cleaners and in metal industry.

The used amounts of 1,1,1-trichloroethane decreased about 100 % between 1989 and 1995 probably due to the ban in 1995.

According to the Finnish product register there are no products containing hexachlorobenzene or hexachlorobutadiene.

The reduction of AOX discharges into waters (1987 to 1999) is > 90 %.

Trends

Endosulfan and trifluralin will be withdrawn from the market by 31.12.2001.

There is work going on under the framework of UN/ECE POP-protocol to estimate the development of dioxin/furan and PAH emissions during 1990's. These estimates will be based on more reliable emission factors and better data on activities, and will be used to evaluate the fulfilment of the 50 % reduction goal.

Discussions with mercury producers and waste treatment companies to improve the collection, treatment and disposal of Hg-waste will be initiated as a result of the recently finalised Nordic report.

The Finnish Environment Institute has prepared in accordance with Government Decision 711/1998 an action programme aiming at ensuring the environmentally sound collection and destruction of PCB equipment not yet destructed.

Data gaps

There are no data on amounts of PCP treated wood still in use nor estimations on possible releases of PCP from these products. However, the releases are minor compared to the time period (before 1984) when PCP was still used.

There are no estimates on actual releases of arsenic, copper and chromium compounds from the wood products treated with preservatives containing these compounds.

Organotin compounds (other than tributyltin- and triphenyltin compounds) may also be used in industries. There are no data on used amounts or discharges from these sources.

No exact use amounts or sales figures at all or for different years available for NP/NPE, SCCP, dichloroethane, trichlorobenzene.

There is no information on amounts of unintentionally formed chloroform (e.g. in car exhaust gases), of unintentionally formed PCB as a by-product in thermal processes.

3.4 Germany

Data

Germany reported on the 50 % reduction list (Annex 6, HELCOM 12/18) and on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5).

Calculation

Emission inventory of the German Baltic Sea Catchment Area of point source discharges from municipalities and industrial plants for 1998. No calculation due to lacking data of the late 1980ies for comparison.

Years

1998 (year of measurements, no data for 80ies), 1999 (organotin compounds)

Results **Pesticides and Biocides**

The 50 % reduction goal for the pesticides of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) is regarded to be fulfilled for most of them since they have never been registered or used, registration has expired or due to complete bans.

Lindane has been only restricted in use, however its registration stopped in the end of 1997 as a plant production product. No emissions have been reported in 1996, whereas in 1985, 50 t have been released. A national emission figure of 15 t in 1994 based on a use of 30 t as a wood preservative in the beginning of the 90ies has been reported. Based on these figures, it can be strongly assumed that the 50 % reduction has been achieved for lindane.

The EU-legislation concerning organotin compounds has been implemented. Its effect on the reduction goal is not entirely known, however it can be assumed that due to the restrictions as antifouling the emissions have been reduced significantly. Triphenyltin is still registered for use in agriculture.

The total discharges of substances [kg/a] discharged from point sources within the Baltic Sea catchment area are listed in table IIIa in the Annex. An assessment whether they have been reduced by more than 50 % is difficult to carry out for the following substances: the metals and their compounds, chloroform, trichloroethylene, tetrachloroethylene, nonylphenolethoxylate, AOX, PAH, pentachlorophenol, organotin compounds and the biocides trifluralin, simazine, atrazine, dichlorvos, lindane (based on the data collected in 1998 on point sources to the water compartment). Nevertheless, as outlined above and below, due to regulations and measures taken since the 1980ies and the consumption figures, a significant reduction can be assumed for almost all substances monitored.

Point discharges to water are assumed to be insignificant for tetrachloromethane, carbontetrachloride, 1,2-dichloroethane, 1,1,1-trichloroethane, trichlorobenzene, and hexachlorobutadiene. Hexachlorobenzene and malathion are totally banned for use as pesticides. Endosulfan, azinphos-ethyl, azinphos-methyl, and fenitrothion are not registered. For fenthion and parathion-methyl restrictions for application are in force. PCB (1989), DDT (1977) and tetrachloroethane have been banned. It can be assumed that the 50 % reduction goal has been probably reached for these substances.

Selenium compounds are completely banned for use as plant protection products.

Consumption figures for trifluralin are reported to be between 50 – 100 t in 1988 and 20 – 50 t in 1985. Atrazine has been used at > 500 t/a in 1988. Although banned since 1992, it is still the second most often detected plant protection product in German surface waters due to the input having taken place before 1992. For dichlorvos, a consumption of < 10 t/a in 1988 and < 2 t/ in 1995 is reported. For those pesticides the fulfilment of the 50 % reduction goal can be assumed, although significant emissions occur from existing use, stockpiles and leaching from soil.

There are no consumption figures available for simazine.

Metals and their compounds

Since the use of cadmium is heavily regulated (Batteries-, Sewage Sludge-, Drinking Water-, Consumer Products-Ordinance etc.) and banned for many applications and products (complete ban for use as plant protection product), a reduction of discharges, emissions and losses from the late 1980ies to the late 1990ies could be assumed. The introduction of cadmium is subject to a charge

levied under the Waste Water Charges Act. The total discharge with industrial wastewater (point source) in 1998 was 14 kg for the Baltic Sea catchment area.

The use of lead is regulated in certain Ordinances and banned for some applications. Within the EU, Germany had, in 1997, the second highest proportion of unleaded petrol consumption. This has led to a substantial reduction of lead emissions. The total discharge of lead with industrial wastewater in 1998 was 274 kg for the Baltic Sea catchment area.

The use of mercury is heavily regulated. However, an estimation about the fulfilment of the 50 % reduction goal can only be assumed due to the reduction having occurred in industrial wastewater. The total discharge of mercury with industrial wastewater (point source) in 1998 was very low (0.012 kg) for the Baltic Sea catchment area.

For metals, the reduction of discharges from point sources between 1985 and 1995 has been in the order of magnitude of more than 80 % (exception: mercury) in the North Sea catchment area. A similar assumption can be extrapolated to the Baltic Sea catchment area.

With regard to the atmospheric emissions, the 50 % reduction goal has been fulfilled for all metals between 1985 and 1995, through various Ordinances of the federal immission control act and the Technical Guidelines on Air Quality (TA Luft) setting up low emission limits (Progress Report of the Esbjerg Conference, 1995).

Organic substances other than biocides

The production of SCCP was stopped by the end of 1995. Substitution of chlorinated paraffins (CP) started already in the mid-eighties. The triggering motives were e.g. global policy issues of pro-active companies, disposal costs, and demands for general optimisation of plants and processes and direct or indirect pressure due to various regulatory instruments. In 1985, 95% and in 1999, 99 % of metal working fluids were chlorine free. According to the EU risk assessment provided by United Kingdom the environmental releases of SCCP deriving from all applications may be (very roughly) estimated (based on sales figures in EU) to 1784 t/1994 and 742 t/1998 for the EU.

The voluntary agreement on renunciation of Alkylphenolethoxylates (APEO, e.g. nonylphenolethoxylates) in a wide range of washing and cleansing products has considerably reduced APEO releases to German surface waters. The total use of APEO in industrial cleaning agents has dropped from 7000 t/a in 1992 to around 15 to 70 t/a in 1999, used in various cleaning products (mainly in cars and metal industry), which are not covered by the industry associations that committed to the voluntary agreement.

The emission, discharges and losses of PCB are reduced significantly compared to the late eighties due to the ban of open uses in 1972, the ban in closed applications in 1978 and the prohibition of any new use since 1989 and the obligation to take out of use and destruct the remaining PCB equipment. The production of PCB was terminated completely already in 1983. The import of PCB containing hydraulic fluids for use in coal mining was terminated in 1988. The emissions have been reduced from 160.1 t/a in 1985 to 42.4 t/a in 1996. However, there are still significant quantities of PCB present in uncontrolled, closed and open applications.

Carbontetrachloride is not used due to the Decisions of the Montreal Protocol (1992). It is banned for use and is not produced anymore in Germany.

Trichloroethylene was consumed in 1985 at 41000 t/a, in 1990 only 11000 t/a and in 1993, 9000 t/a have been purchased on the CFC market. According to the Immission Control Act, it is only permitted in surface treating facilities.

Tetrachloroethylene was purchased in 1985 at 82000 t/a, for which a 100 % emission can be assumed. Currently it is produced at 73700 t/a, however emissions are regulated by the Immission Control Act. For 1990 an emission of 11693 t/a can be roughly estimated, which corresponds to a reduction of 83 %.

Atmospheric emissions of dioxins have been reduced by 74 % between 1990 and 1995.

With regard to PAH emissions, in the POPCYCLING Baltic project, it has been estimated, that Benz[a]pyrene decreased from 170 t/a in 1985 to 26 t/a in 1996. However, PAH emissions may not be related to just one congener.

Pentachlorphenol (PCP) was used in the early 1980ies at ca. 60 % for wood protection and ca. 30 % as a fungicide. The consumption was 40 – 190 t/a in 1984. In 1989, PCP was completely banned and the 50 % reduction goal may be assumed to be fulfilled. Nevertheless, despite the ban of production and use, PCP was found in the discharges of all municipal wastewater treatment plants, with loads in the area of < 1 kg/a. Also high concentrations were found from two paper factories in Brandenburg. Chlorine bleaching is not longer applied in paper industry production and may be thus ruled out as a source of PCP emissions. It may be possible that the wastepaper used as raw material for recycling may provide further indications of this PCP source.

Trends

Projects to investigate alternative technologies and development of chemical alternatives to organotin antifouling paints have been carried out. A new biocide-free polymeric binder with self-polishing properties, which can be used for all kinds of antifouling applications, including also biocide-free antifouling systems is under development but will probably be on the market well beyond the year 2003. For the near future, the installation of boat washing and other cleaning installation are conceivable. A ban is foreseen in 2003.

According to PARCOM Decision 95/1, the SCCP should be phased out by 31 December 1999 in metal working fluids and in major uses as plasticisers in paints, coatings and sealants and as flame retardant in rubber, plastics and textiles. The use as plasticisers in sealants in dams and in conveyor belts for the exclusive use in underground mining should be phased out by 31 December 2004.

Nonylphenol and nonylphenolethoxylates are not banned or restricted. However, there a several areas of voluntary agreements to renounce the use of NP/NPE. After full implementation of all APEO related voluntary agreements, the major part of NPE risk reduction will be implemented in Germany.

With regard to PCB the Executive Order of May 2000 requires that PCB containing appliances containing 1 litre or with concentrations above 50 ppm must be disposed safely. With this Executive order, EU law is implemented more stringently in Germany (1 litre instead of 5 litre). The quantification of releases of PCB still in use is extremely difficult.

Data gaps

No data of the late 1980ies are available for comparison. Therefore a quantitative calculation of the percentage of reduction is not possible. The reduction goals are thus more or less estimated qualitatively, based on measures taken and consumption figures. The results of the research project give a quantitative indication of the achievement of the 50 % reduction goal and only for point source

discharges from municipalities and industrial plants for the water compartment. No quantification of diffuse sources and input by sediments and suspended matter are given.

3.5 Latvia

Data Latvia reported on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5).

Calculation No calculation. A report on national programmes, developed in order to achieve the reduction goal has been submitted.

Years No

Results

Pesticides and Biocides

The pesticides are either banned or not registrated/licensed for use as a plant protection product. Mercury is prohibited as plant protection product since 2000. The current amount of accumulated old stocks of pesticides is 1480 t, among them 172 t DDT, 43 t mercury products and 155 t HCH products (e.g. lindane, fentiram, pentathiuram). 128 t are not yet identified. Toxaphene is also mentioned to be stockpiled.

Metals and their compounds

For lead, cadmium and mercury emission inventories are available for 1990 and 1995. Within that period lead was reduced by 76 %, cadmium by 44 % and mercury by 54 %. It remains unclear by which means this reduction was reached.

Trends The marketing and use of cadmium, lead and pentachlorophenol will be banned/restricted from 2001 on.

Data gaps Lacking information on emissions, discharges and losses, production-, sales- or consumption volumes for any substances and years, make it impossible to calculate the reduction goal.

3.6 Lithuania

Data Lithuania reported on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5).

Calculation Emissions and discharges (lead, cadmium), emissions (mercury)

Years 1990/1995/1996/1997/1998 (lead, mercury, cadmium)

Results

Pesticides and Biocides

The pesticides of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) are either banned or not registrated. So the 50 % reduction goal might be fulfilled. The current amount of accumulated old stocks of pesticides is 2500 t, among them 80 t DDT and 24 t HCH products (e.g. 570 kg lindane, fentiuram, pentathiuram). 1200 t are not yet identified. Stockpiles are also mentioned for quintozene (479 kg), pentathiuram (40177 kg, 20 % quintozene), pentachlorophenol, nitrophen (62166 kg), hexachlorobenzene (303 kg, 18315 kg hexathiuram, 30 %) and mercury containing products (19045 kg).

Metals and their compounds

Discharges of lead increased between 1995 and 1998. Total emissions of lead decreased between 1990 and 1998 around 63 % due to the phasing out of leaded gasoline by the end of 1997.

Total emissions of mercury from combustion processes decreased between 1990 and 1998 around 22 % probably due to some new regulations (e.g. on waste incineration). The use of mercury is restricted and banned for certain applications and products.

Discharges of cadmium into surface water decreased between 1995 and 1998 by about 66 %. Total emissions of cadmium decreased between 1990 and 1998 around 37 %. The use of cadmium is restricted and banned for certain applications and products.

Organic substances other than biocides

Since 1999 PCB may not be used and placed on the market. The use of PCB as a pesticide is banned since 2000. However, this is too short a time to make any calculation.

Trends Collection of mercury containing electrical equipment, mercury containing waste management system will be in place till the end of 2000.

Data gaps A calculation of the percentage of reduction is not possible due to the lack of any consumption-, production-, sales-, emission- etc. data for most of the substances.

3.7 Poland

Data Poland reported on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) and on some substances from the 50 % reduction list (Annex 6, HELCOM 12/18).

Calculation discharged riverine loads, estimated total air emission

Years 1987/1995 (mercury, lead, cadmium, DDT – discharged riverine loads), 1990/1995 (mercury, cadmium, lead – total air emission)

Results

Pesticides and Biocides

The 50 % reduction goal for the pesticides of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) is regarded to be fulfilled since most of them have not been registered or used for at least 10 years. However, there are strong indications that a lot of obsolete pesticides are stockpiled under bad conditions, which allow e.g. leakage to waterbodies. The amount of DDT in registered tombs for example exceeds 600 tons. The total stock of 15 obsolete pesticides is approximately 1600 tons. Organotin compounds are marketed and used. The total amount of organotin compounds sold is estimated to 7 tons per year.

Metals and their compounds

The discharged riverine loads of the following heavy metals were reduced between 1987 and 1995: mercury 87.5 %, cadmium 80.5 %, lead 70 %. The riverine load of DDT was reduced from 1990 to 1995 by 62 %. The total air emission of the following metals was reduced between 1990 and 1995: mercury 3 %, cadmium 9.8 % and lead 32 %. There are no explanations given for the reductions.

The reduction of lead could be due to a limited lead concentration in fuel, and tax incentives for unleaded fuel. Unleaded fuel is on the market since 1996 and in 2001 there will be a significant decrease of leaded gasoline supply. Production, import and marketing of lead and mercury is partly only allowed with permissions. Limit values for lead concentration in wastewater discharges, sewage sludge and in air exist.

The non-ferrous metal industry is undergoing large economical and technological changes. Production is decreasing, technologies are being improved, discharges and emissions are decreasing. Thus, the total load of lead discharged to the Baltic Sea decreased from 217 tonnes in 1990 to 127 tonnes in 1995 and 62 tonnes in 1997.

Organic substances other than biocides

SCCP are not regulated within Polish law and not monitored. They are not produced in Poland. However, possible uses are unknown.

Nonylphenol and nonylphenolethoxylates are not regulated within Polish law and not monitored. They are produced and widely used in Poland.

Trends Except PCB no specific substances are referred to in State Environmental Policy, but planned measures will undoubtedly have strong influence on the production/use/discharges etc. of many hazardous substances. Council Directive 96/59/EEC will be transposed into Polish law in 2000/2001 and implemented until the end of 2002.

To coordinate and make sustainable all the activities in the field of environment on one hand and economy on the other, a National Environmental Policy was defined in 1991. Due to deep socio-economic and political changes (e.g. adoption of a new Constitution in 1997) there was a need to elaborate a new environment policy

making it consistent with the main legal act. A Draft Second National Environment Policy has been adopted by the Polish government in 2000 and has established the following main goals:

Short-term priorities (for the years 2000-2002)

- general assessment of 2000 substances manufactured in large amounts, detailed assessment of 200 substances most dangerous for the environment and 50 substances covered by complex programmes of risk reduction
- evaluation of national and regional waste management plans, including hazardous waste
- evaluation and first stages of emission reduction programs implementation for heavy metals and PAH, PCDD, PCDF
- introduction of integrated permits for emission (in accordance with IPPC Directive);

Medium-term priorities (till 2010)

- introduction of chemical substances registers (with regard to substances manufactured in and imported to Poland);
- introduction of EIA for new substances and products
- increasing of recycling rate of industrial production wastes (to double the 1990 recycling rate
- creation of integrated infrastructure for safe collection, segregation, transport and utilisation of hazardous waste (incl. used batteries and oils)
- registration and elimination of the equipment containing PCB; safe utilisation of oils containing more than 50 ppm PCB/PCT
- final implementation of the program aimed at the disposal of old and banned pesticides stored in graveyards
- reduction or total abandonment of manufacturing and use of hazardous substances (heavy metals, POP and ozone-layer depleting substances) referred to in EU Directives and other international agreements
- land filling only harmless rendered hazardous substances
- HM (Cd, Hg, Pb) and POP (pesticides, PCDD, PCDF) emission reduction including reduction or abandonment of manufacturing and use products containing those substances;
- total abandonment of use Pb-containing fuel (till 2005).
- Long-term priorities (till 2025)
- full implementation of international agreements and decisions with regard to chemical safety
- final disposal of stored and land filled hazardous wastes
- further reduction of loads discharged with industrial wastewater including total elimination of hazardous substances in treated wastewater discharged to surface water bodies
- full implementation of international agreements and decisions on reduction or abandonment of manufacturing and use substances and products containing hazardous air pollutants

Data gaps

The evaluation of the achievement of the 50 % reduction target with regard to hazardous substances is not possible since data on discharges, emissions and losses in 1980s are not available, with only several exemptions. There is also a lack of detailed information on the situation in the year 1995 (or any other year of the late 90ies).

In principle there is no information available concerning production, industrial and consumer uses (at least not for comparable years), relevant modes of applications, discharges, emissions and losses to water and air, amounts of imports and exports (raw material, products, articles, goods), amounts of sales per year, illegal or identified uses.

3.8 Russia

Data

Russia reported on the pesticides of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) and on some biocides and the heavy metals from the 50 % reduction list (Annex 6, HELCOM 12/18).

Calculation Discharges (heavy metals)

Years 1989 – 1999 (heavy metals)

Results

Pesticides and Biocides

The pesticides of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) are either banned or not in use. So the 50 % reduction goal might be fulfilled. Some biocides from the 50 % reduction list (Annex 6, HELCOM 12/18) are still registered as pesticides (trifluralin, atrazine, fenitrothion, fenthion, malathion), some are not in use (azinphos-ethyl, hexachlorobenzene) or banned (endosulfan, simazine, parathion-methyl, dichlorvos, lindane).

Metals and their compounds

For the heavy metals the 50 % reduction goal has been achieved with regard to discharges. This is due to decreasing industrial production, the closing down of old non-effective plants and galvanic companies, the construction or modernization of industrial waste water treatment plants, and the modernization of municipal WWTP and expansion of WWTP capacity.

Organic substances other than biocides

4-nonylphenol is used as an industrial chemical. It is subject to different legal acts. However, no information concerning consumption or release to the environment is available. For the remaining substances no information has been submitted.

Trends In 1995 the Government of the Russian Federation has adopted the program "Protection of environment and population from dioxins and dioxin-similar substances on 1996-1997." Due to insufficient financing only planning works have been carried out so far. In 1997 the Hamburg Declaration was signed by the governor of Saint Petersburg concerning the development of "Agenda 21 for Saint-Petersburg."

Data gaps The evaluation of the achievement of the 50 % reduction target with regard to hazardous substances is not possible since data on discharges, emissions and losses in 1980s are not available, with only several exemptions. There is also a lack of detailed information on the situation in the year 1995 (or any other year of the late 90ies).

In principle there is no information available concerning production, industrial and consumer uses (at least not for comparable years), relevant modes of applications, discharges, emissions and losses to water and air, amounts of imports and exports (raw material, products, articles, goods), amounts of sales per year, illegal or identified uses.

3.9 Sweden

Data Sweden reported on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) and on the substances from the 50 % reduction list (Annex 6, HELCOM 12/18).

Calculation discharges and emissions to water and air (metals), use volumes (biocides, tributyltin compounds, cadmium, lead), production/import volumes (nonylphenolethoxylates, chlorinated paraffins),

Years 1987/1990/1992/1995 (metals), 1980/1985/1990/1995 (cadmium use volume), 1990/1992/1996 (lead uses in production), 1985/1988/1990/1995 (mercury emissions from point sources), 1995/1999 (tributyltin compounds), 1990/1995/1997/1998 (nonylphenolethoxylates), 1995/1998 (trichloroethylene), 1994/1998 (tetrachloroethylene), 1995/1998 (xylenes), 1999 (chloroform), 1993/1994 (dioxins), 1991/1994 (AOX), 1990/1995/1998 (chlorinated paraffins),

Results

Pesticides and Biocides

The 50 % reduction goal for most of the biocides of the 50 % reduction list (Annex 6, HELCOM 12/18) is regarded to be fulfilled since they are not/no longer in use. Trifluralin, endosulfan (1995), simazine (1995), atrazine, azinphos-ethyl, fenitrothion, fenthion, malathion, parathion, parathion-methyl, dichlorvos, chlorpicrin, lindane, PCP, hexachlorobenzene, trichlorobenzene 1,2-dichloroethane and triphenyltin-compounds (1995) are not in use as biocides. The used volume of azinphos-methyl increased from 1.6 t in 1994 to 2.2 t in 1998. In 1999 it was again reduced to 1.5 t. Further used volumes in 1999: copper compounds 648 t, zinc compounds 94.6 t and arsenic compounds 376.8 t. A calculation of reduction is not possible. The pesticides of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) are either banned long ago or have never been registered or used, thus the 50 % reduction goal is regarded to be fulfilled.

Metals and their compounds

The overall assessment shows that substantial reductions on inputs to water and air for most of the metals (mercury, cadmium, copper, zinc, lead, arsenic, chromium, nickel) have been achieved. The 50 % reduction goal was more than fulfilled for all metals except nickel with regard to inputs to air. Concerning input into water the 50 % reduction goal was slightly missed for mercury, chromium and nickel. The riverine input of zinc and copper even increased between 1990 and 1995.

The use of cadmium compounds as stabiliser, pigment or in alloys has almost ceased, since the introduction of the ban in 1982. However, the total amount of Cd is still at a level corresponding to the 1970s, due to the extraordinary increase in the use of NiCd-batteries. The maximum limit value and the tax, combined with voluntary efforts in food industry, have lead to significantly reduced cadmium content in phosphorus fertilisers since the beginning of the 1990´s (60 mg/kg P compared to 25). The cost to Swedish agriculture of the cadmium tax was 0.03 % of the total revenue in the agricultural sector in 1995.

The 50 % reduction goal of lead emission to water and to air is regarded to be fulfilled due to a legal stop for sale of leaded petrol to consumers since 1994,

extended ban of use of lead shot, and ban of lead in chemical products sold to the general public.

The reduction of mercury might be due to the ban of the professional manufacturing and sale of mercury thermometers and other measuring instruments, level switches, pressure switches, thermostats, relays and electrical contacts in January 1993.

Organic substances other than biocides

The total use of SCCP has been reduced by 90 % between 1990 and 1998, mainly due to a serious reduction within the use as metal working fluids and paints. The goal of a total phase-out in chemical products is predicted to be met in the year 2001 mainly through voluntary phase-out activities by importers, producers and users of chemical products. No production of chlorinated paraffins in Sweden.

The production/import volumes of nonylphenolethoxylates decreased between 1990 and 1998 in total about 90 %. This reduction was mainly due to the decrease in the industrial cleaning sector (99.9 %) and the chemical industry (52.4 %). In 1991 the Parliament set the goal that at least 90 % of the use as industrial cleaning agent, which is assumed to pose the largest risk for the environment, should be phased out by 2000 through voluntary measures within industry concerned.

PCB is not allowed to import, manufacture or use. So the emission, discharges and losses are assumed to be reduced compared to the late eighties due to prohibition of any new use since 1986.

The reported volumes of tributyltin compounds decreased from 7 t in 1995 to 3.4 t in 1999. The average annual import/production of organotin stabilisers for PVC (with > 80 % the dominating use) was approx. 340 tonnes 1996-98. Since 1992 tributyltin compounds are not allowed to be used in anti-fouling paints (except on vessels > 25 m mainly operating on the oceans).

The commercial use of carbontetrachloride has been discontinued by the end of 1995. Trichloroethylene was banned for professional use in 1996 with possibilities for exemptions. The production/import volumes for trichloroethylene decreased from 2130 t in1995 to 1669 t in 1998 (21.6 %), for tetrachloroethylene from 1727 t in 1994 to 655 t in 1998 (62 %). 1,1,1-trichloroethane was banned for use since 1995 (exemptions possible). The production/import volumes for xylenes in major chemical industry increased from 22500 t in 1995 to 32000 t in 1998.

The discharges of dioxins as an average for the largest industrial facilities decreased from 927 g in 1993 to 598.5 g in 1994 (35.4 %), for AOX from 18706 t in 1991 to 8593 t in 1994 (54 %). For PAH no reliable figures are available. In 1999 22 t of chloroform were used, approx. 500 t were exported. A reduction calculation is not possible. In 1999 1,2-dichlorethane was not in use but 151500 t were produced as an intermediate in the PVC production. Of trichlorobenzene, hexachlorobenzene and pentachlorophenol 0 t were registered.

Trends

All uses of lead should be phased out in the long term, primarily through voluntary measures/ agreements with the interest organisations (e.g. Swedish Paint and Printing Ink Markers Association, Swedish Hunters´ Association, Swedish Fishermen's Federation). The phase-out activities have mainly been aimed at the use in accumulators, lead shots, paint, crystal glass, PVC, cables and lead sinkers. The government is considering a total ban on lead shots. A timetable exists for the phase-out of stabilisers in PVC. The Swedish users have taken a policy decision to phase-out lead in cables, although there are no commercial alternatives to all types of lead sheathed sea cables. No commercially available alternative has been

developed for accumulators.

After commission by the Government, the National Chemicals Inspectorate in May 2000 handed over proposals for phase-out plans (e.g. voluntary agreements) for organotin stabilisers in PVC, including economic implications (KEMI Report No. 6/2000 Organotin stabilisers in PVC). It promotes also the development of alternative paints as well as mechanical anti-fouling techniques.

Companies have accepted an obligation to investigate and substitute PCB (sealant, small capacitors, fluorescent light fittings) in buildings before 2004.

The government is considering a ban on the sale and use of mercury and chemical compounds containing mercury light sources, a maximum mercury content limit for the sale of light sources and a time limit (31 December 2009) for the use of mercury in chloralkali industry.

Data gaps

No valuable info concerning selenium/compounds. Information on relevant discharges, emissions and losses from point sources and diffuse sources are either given for only one year or there are no data at all available. Information on the amount of discharges to water/emissions to air and losses (from production, use, storage, transport and waste treatment) within the catchment area of the Baltic Sea are not available for NP/NPE, SCCP, organotin compounds, PCB.

Data concerning the amount substances in imported chemical products, articles and goods are not available except for SCCP.

4. LEARNING POINTS WITH REGARD TO A SUBSTANCE SPECIFIC REDUCTION TARGET

Taking into consideration the experience made with the questionnaire and the problems encountered with the technical preparation, the reporting format, the availability and comparability of data, several learning points can be drawn from that approach.

Reporting format

For the reporting on the 50 % reduction list (Annex 6, HELCOM 12/18) no reporting format existed. For the reporting on the extract of the list of selected substances for immediate priority action (Appendix 3 of Rec. 19/5) a questionnaire was developed. The questionnaire was developed to seek for a huge amount of very detailed and highest quality data. At the same time it gave only the electronic reporting frame but no real reporting format.

So, the experience made with the questionnaire and the reporting format show that t is not easy – but crucial - to formulate simple and precise questions substance by substance and to provide a clear and stringent reporting format so that a certain comparability is possible. It might be also useful to have a test run before sending out such a questionnaire to all Contracting Parties and to offer a common training for the people who have to deal with that issue.

Calculation methods

Input data reported by Contracting Parties were on a high degree based on available data and thereby varied in many aspects with regards to e.g. sampling and analytical methods, reporting years as well as methods of calculation applied (consumption, sales figures, production, total emission to air and/or water, point sources discharges, used amounts, imported amounts etc.). Since there is no exact baseline for calculation and since some countries had already reduced their discharges and emissions some years before this “calculation basis” (late 1980ies) a valuable comparison of data from different countries is not possible. That shows that assessment procedures and calculation methods have to be harmonized beforehand as much as possible. Due to the different socio-economic and administrative structures and to differences in openness to information among the Contracting Parties it might be also necessary to develop different – more country-tailored - methods to follow such an approach.

Comparability

Reduction figures in consumption do not necessarily reflect a reduction of emissions and discharges: a) releases to the environment are very much depending on the area or type of use, b) products or installations in use may still emit hazardous substances into the environment although consumption has already been largely reduced. Hazardous substances stored as waste like e.g. obsolete pesticides may be released to the environment though they have been banned for use.

Resources

One important point is that enough time and personnel is devoted to such a task. The designated persons have to act rather as multipliers, involving all relevant actors in their country, than trying to submit all data on their own. Unfortunately, most of the Contracting Parties were not in the position to provide sufficient financial and personnel resources to successfully work on that issue.

Availability of data

One reason for a part of the failure is that some data, which should be submitted, do not exist at all and are therefore not available within the

Contracting Parties. Especially for the data for the mid 1980ies the usefulness to further seeking these data is questionable.

Sustainability

The main question is however, if the result of this 50 % reduction approach is well balanced with the efforts made. In order to assess the possible meaning and the sustainability of a reduction for the environment it is necessary in the future work of the HELCOM Hazardous Substances Strategy to describe more detailed where exactly this reduction has taken place (which source, which exposure route, which use pattern), with which means or measures and whether it is a durable reduction or only due to e.g. temporary industrial breakdowns.

5. ADDITIONAL CONSIDERATION TO EVALUATE PROGRESS

The available data mostly do not allow a final quantitative judgement whether or not the reduction goal of 50 % was reached. So the tables 6 and 7 in the Annex provide only an overview and a rough estimation. However, by using more qualitative information it might be possible to evaluate to which extent the 50 % target has been reached:

⇒ The Baltic countries, Russia and Poland have undergone deep socio-economic changes since 1989. Agricultural output and industrial production has decreased by 20 % to 50 % between 1990 and 1995. It can be assumed that the use of plant protection products and industrial chemicals as well as industrial emissions may also have significantly decreased in that time (Second Baltic State of the Environment Report 2000). Furthermore, the specific amount of pesticides used per hectare has decreased much due to the lack of income in rural areas. However, with growing economy also use and/or emissions of hazardous substances may increase again.

⇒ In economies in transition the emission of certain hazardous substances may have increased despite the fact that the overall industrial and agricultural activity went down:

- ⇒ Increasing use of alternative fuel for residential heating and in small industries may under particular circumstances lead to higher emission of PAH and dioxins to air.
- ⇒ Increasing pressure on ship owners and shipyards in the EU to phase out the use of TBT containing coatings may lead to an increasing use of this antifoulings on ship yards outside the EU.
- ⇒ Accelerated risk reduction measures on certain substances in EU countries, e.g. NPE, mercury or TBT may lead to exports of these products to countries not yet members in the EU.

Such substances need careful observation under the new long-term objective, the cessation target. Various data collection strategies will be used for that in future.

⇒ It might be that small and medium sized enterprises try to reach competitiveness in maintaining the use of cheaper raw material imported from former Soviet Union. This raw material might contain significant concentrations of hazardous substances.

⇒ The use of leaded gasoline has significantly decreased or even phased out by now in all States bordering the Baltic Sea. Thus, one of the most relevant sources of lead in the Region has been largely reduced. Lead emissions and discharges from non-ferrous metal industry are decreasing (at least in Poland) due to decreasing production and technological changes. However, due to the widespread usage of lead in numerous industrial and private use applications there are high uncertainties concerning consumed annual volumes and diffuse emissions.

⇒ Wastewater treatment was the focus of many investment projects in the Eastern European countries during the last 10 years. Hence pollution load of metals and chlorinated solvents has decreased.

⇒ In the Nordic Countries, national pesticide reduction programs have been carried out in the last 10 years. Also priority hazardous organic substances, such as SCCP or nonylphenol have been on the agenda for these countries for a long time. With regard to products use the data from Nordic product registers clearly show the decreasing trend.

⇒ For some substances both the socio-economic development nor reduction programs and investment in wastewater technology influences the releases to the environment. This is for example the case for diffuse sources of metals and releases of PCB from equipment and waste. Evaluating these releases as a basis to set up reduction measures need very particular approaches.

⇒ Based on these considerations in combination with some of the data given it may be concluded that is very likely that the 50 % target has been reached for most of the substances. However specific substances in specific applications need further attention. This can be established based on current knowledge and does not need further data collection exercises. Also, knowledge of exact figures on the development between 1988 and 1998 is not needed to cease the remaining emissions, losses and discharges of the hazardous substances listed in table 6.

6. CONCLUSION

Based on the information compiled in this report and the learning points addressed the following conclusions can be drawn:

⇒ The 50 % reduction goal can be taken as largely reached. This conclusion is partly based on substances specific data on release and occurrence, and on the general assumption made under chapter 5.

⇒ Those substances, which are still of concern should be dealt with under the HELCOM Hazardous Substances Strategy (cessation goal).

⇒ Target setting should include in future more careful considerations on the right indicators to measure progress and the methods to obtain data necessary to work with such indicators.

⇒ The focus for the future work should be on practical reduction measures, administrative capacity and industry efforts needed for implementation.

⇒ The 50 % target has now been replaced by the cessation target with regard to certain hazardous substances. This will be the guiding objective for the further work.

7. REFERENCES

Baltic Environmental Forum (2000): Second Baltic State of the Environment Report 2000 based on environmental indicators.

Data submitted by the Contracting Parties.

Filled questionnaires from the Contracting Parties.

HELCOM (1996): Third Periodic Assessment of the State of the Marine Environment of the Baltic Sea, 1989 - 1993, Baltic Sea Environment Proceedings. No. 64 A-B.

HELCOM (2001): Fourth Periodic Assessment of the State of the Marine Environment of the Baltic Sea, 1994 - 1998, Baltic Sea Environment Proceedings.

HELCOM Recommendation 19/5 on the HELCOM Objective with Regard to Hazardous Substances. Adopted 26 March 1998.

Ministry of the Environment and Energy, Danish Environmental Protection Agency (1995): Progress Report. 4th International Conference on the Protection of the North Sea. Esbjerg, Denmark, 8 – 9 June 1995.

8. ANNEX

Tab. 1: Chronology of the Implementation of the 1988 Ministerial Declaration on the Protection of the Marine Environment of the Baltic Sea Area

Year	Meeting	Subject
1988	Ministerial Declaration	Ministers adopted the Declaration on the Protection of the Marine Environment of the Baltic Sea Area: Substantive reduction of the substances most harmful to the ecosystem of the Baltic Sea, especially of - heavy metals and toxic or persistent organic substances, and - nutrients for example in the order of 50 % of the total discharges of each of them, as soon as possible but not later than 1995.
March & Sept. 1990	Working Group on Criteria & Standards for Discharges of Harmful Substances to the Baltic Sea (WGS)	Matters related to harmful substances were discussed. Revision of the whole system of handling harmful substances. Submission of proposal for "The Baltic Sea list of priority harmful substances other than nutrients for immediate action in order to reach the 50 % reduction goal by 1995". Development of "The Principles for National Programmes to achieve the 50 % reduction goal for heavy metals and toxic or persistent organic substances".
Oct. 1990	1st meeting of the Technological Committee (TC-1)	Draft Baltic Sea list of priority harmful substances was endorsed; preparation of the "Waiting List of Harmful Substances"
Feb. 1991	Commission Meeting HELCOM 12/18	Took note of the progress report on implementation of the 50 % reduction goal, adopted the priority list (Annex 6) & recognized that the input data reported by CPs vary in many aspects with regards to e.g. sampling, analytical & calculation methods. Due to that it was not possible to make any calculation concerning the 1987 total amount of the inputs for specific pollutants or to compare data from different countries.
Feb. 1992	Commission Meeting	Decided to establish an ad hoc Expert Group on Harmful Substances (TC CHEM) under TC DIFF. According to the Terms of Reference (TC 2/13 Annex 3) the duty of this Expert Group was *inter alia* to continuously review 'the Waiting List of Chemicals', to propose chemicals for the priority list, identify chemicals to be banned totally or partly & identify substitutes with less adverse impact on the environment
Feb. 1993	Commission Meeting HELCOM 14/18	The commission endorsed the inclusion of lindane to the priority list.
March 1994	Ministerial HELCOM Meeting (HELCOM 15)	Assessment of the progress in the implementation of the previous Ministerial Declarations & associated HELCOM Recommendations. The submitted Interim Implementation Status Report revealed only few promising achievements in implementing the 50 % reduction goal.
1995	TC/EC Committees Joint Session	Adopted guide on the content of national reports on measures to reduce heavy metals & persistent organic pollutants (POP). The Committees also proposed that an ad hoc meeting would be convened for the assessment of national measures to reduce HM & POP.
June 1996	TC/EC ASMOP Meeting	Based on the scarce & incomplete available information & figures, the meeting concluded that it was not possible to provide any meaningful compilation in line with the guides or to draw any conclusions on reduction figures between 1987 & 1995.
Sept. & Dec. 1997	Meetings of a Project Group	Preparation of Action Programme for Phasing-out Discharges, Emissions & Losses of Hazardous Substances. Development of Objective & Implementation Strategy.
March 1998	Ministerial HELCOM Meeting (HELCOM 19)	The Commission considered the Final Report on the Implementation of the 1988 Ministerial Declaration, published as the "Baltic Sea Environment Proceedings No. 71", which concludes that, despite all the efforts by CP, the overall or nation-wide reduction target has not been reached for all polluting inputs to the extent called for in 1988. It reaffirmed the commitment of the CPs to the strategic goals set up in the 1988 Ministerial Declaration & decided to drive forward the progress by defining more specific targets, aimed at the most cost effective solutions, to be implemented not later than 2005 & reviewed provisionally in 2003.

Year	Meeting	Subject
		Adoption of the HELCOM Recommendation 19/5 with Regard to Hazardous Substances. The Project Team for the Implementation of the HELCOM Objective with regard to Hazardous Substances was established.
May 1998	TC RED 3/98	Terms of References for the Project were elaborated: identification of sources, pathways & fate of hazardous substances and initiation & promotion of the development of different policy instruments to take into account phasing out, substitution and/or minimised use & reduction of discharges of hazardous substances. The work should start with selected substances as set out in Appendix 3 of the HELCOM Rec. 19/5.
Oct. 1998	1st Meeting of the Project Team for the Implementation of the HELCOM Objective with Regard to Hazardous Substances	The Project Team, supported by TC 9/98, decided to start a pilot programme on a pragmatic selection of substances of the priority list of the HELCOM Rec. 19/5 and discussed the relation between the target of the Ministerial Declaration & the goal for the Strategy on Hazardous Substances. The meeting concluded that several substances were the same on the HELCOM list of selected substances for priority action (Appendix 3 of the HELCOM Objective) & the list of substances for which a 50 % reduction goal was set by the Commission. The meeting decided on a pragmatic approach to address these lists together. A questionnaire was elaborated. It was agreed that the implementation of the 50 % reduction goal could be an important first step in the implementation of the HELCOM Objective.
Feb. 1999	2nd Meeting of the Project Team for the Implementation of the HELCOM Objective with Regard to Hazardous Substances	Further discussion of the questionnaire, which was then submitted to CPs for completion. CPs were supposed to report before the end of 1999 changes in the discharges, emissions and losses of these substances in the catchment area, - for the late 80´s - for the present (late 90´s) - planned measures and activities for implementation The discharges, emissions and losses should be given as national figures.
Jan. 2000	3rd Meeting of the Project Team for the Implementation of the HELCOM Objective with Regard to Hazardous Substances	The Project Team noted in the first assessment that the supplied data were very insufficient for the intended calculations and elaborated an intersessional working plan to be done by the Coordinator who was appointed in Feb. 2000. The results of the questionnaire should be evaluated in the following order: the pesticides/biocides PCB, mercury remaining substances to reveal the legislative situation and the data gaps. In doing so, the CPs are invited to review the information given, and to instruct the Co-ordinator how to improve it. The Co-ordinator will make an analysis and present the outcome at the 4th Meeting for discussion on how to proceed.
Aug. 2000	3rd Meeting of the Heads of Delegation	The Meeting took note of the Progress Report of the Project Team for the Implementation of the HELCOM Objective with Regard to Hazardous Substances, the current situation and the problems the Project Team is facing and adopted the proposal to use the data submitted for the late 90`s as a new basis for calculation and to define new milestones. The Meeting further decided that a final report concerning positive as well as negative results of the 50 % reduction goal will be submitted and the future work should focus on measures to reduce and phase-out hazardous substances taking into consideration the relevant work within EU and OSPAR (LD 5).
Oct. 2000	4th Meeting of the Project Team for the Implementation of the HELCOM Objective with Regard to Hazardous Substances	The Coordinator presented an analysis of the reviewed information given by the CPs. The Project Team noted that the data situation had not been much improved. However, most of the pesticides on the list for immediate priority action are not in use. After inclusion of some outstanding information and results about stockpiles a pesticide report will be published. With respect to the final report on the progress towards the 50 % reduction goal the Meeting decided that the Coordinator will elaborate a new overall conclusion (taking into account the Progress Report of the Esbjerg Goal, 1995), which should focus of the reduction results, trends and data gaps as well as on the experience from that approach and the

Year	Meeting	Subject
		reasons for the problems encountered. The Meeting took note of the regulatory status of PCB and Mercury and the data gaps and decided that the future work should focus on further data collection strategies and elaboration of measures aiming at reduction and cessation of emissions, discharges and losses of hazardous substances. Therefore the Coordinator will make analyses ❑ of appropriate measures to reduce releases of PCB from existing equipment ❑ of the concern of mercury in the Baltic Sea Area *inter alia* due to undesirable new applications To get an overview about the major sources of potential exposure in the Baltic Sea Area and propose how to proceed with the collection of data and elaboration of measures, SCCP, NP/NPE and organotin compounds were selected for downstream user analysis including information from EU, OSPAR and downstream user associations.
March 2001	5th Meeting of the Project Team for the Implementation of the HELCOM Objective with Regard to Hazardous Substances	The Coordinator presented a final report on the progress towards the 50 % reduction goal the Meeting. Further, a guidance document for authorities and all owners and users of PCBs was elaborated by the Coordinator.The Meeting decided to submit these drafts to HELCOM LAND 3/2001, seeking for adoption.

Tab. 2: Baltic Sea List of priority harmful substances other than nutrients for immediate action in order to reach the 50 % reduction goal by 1995 (HELCOM 12/18, Annex 6, 1991)

			Water	Air	CAS-number
I	METALS AND THEIR COMPOUNDS				
	1.	Mercury	+	+	
	2.	Cadmium	+	+	
	3.	Copper	+	+	
	4.	Zinc	+	+	
	5.	Lead	+	+	
	6.	Arsenic	+	+	
	7.	Chromium	+	+	
	8.	Nickel	+	+	
II	ORGANIC SUBSTANCES OTHER THAN BIOCIDES				
	9.	Carbontetrachloride	+	+	56235
	10.	Chloroform	+		67663
	11.	Trichloroethylene	+	+	79016
	12.	Tetrachloroethylene	+	+	127184
	13.	Trichlorobenzene	+	+	-
	14.	Dichloroethane 1,2-	+		107062
	15.	Trichloroethane 1,1,1-	+	+	71556
	16.	Xylenes	+	+	-
	17.	Hexachlorobenzene	+	+	118741
	18.	Hexachlorobutadiene	+		87683
	19.	Nonylphenolethoxylate	+		-
	20.	Dioxins	+	+	n.a.
	21.	Halogenated organic substances measured as AOX *	+		-
	22.	PAH	+	+	-
	23.	Tributyltin-compounds	+		-
	24.	Triphenyltin-compounds	+		-
	25.	Pentachlorophenol	+	+	87865
III	BIOCIDES				
	26.	Trifluralin	+		1582098
	27.	Endosulfan	+		115297
	28.	Simazine	+		122349
	29.	Atrazine	+		1912249
	30.	Tributyltin-compounds	+		
	31.	Triphenyltin-compounds	+		-
	32.	Azinphos-ethyl	+		2642719
	33.	Azinphos-methyl	+		86500
	34.	Fenitrothion	+		122145
	35.	Fenthion	+		55389
	36.	Malathion	+		121755
	37.	Parathion	+		56382
	38.	Parathion-methyl	+		298000
	39.	Dichlorvos	+		62737
	40.	Copper-compounds	+		
	41.	Zinc-compounds	+		
	42.	Arsenic-compounds	+		
	43.	Carbontetrachloride	+		56235
	44.	Chlorpicrin	+		76062
	45.	1,2-Dichloroethane	+		107062
	46.	Hexachlorobenzene	+		118741

HELCOM 14/18, Feb. 1993: inclusion of lindane

Footnotes:

Although the 50% reduction is not always possible to document, all efforts including the use of BAT, clean production systems "from cradle to grave" and the precautionary principle should be taken to reduce the discharges.

*Further specification is needed for the group with regard to sources from which these substances originate (both point and diffuse sources).

Tab. 3: Selected substances for immediate priority action (Rec. 19/5, Attachment, Appendix 3)

Casn	Name
	Alkanes
85535848	Chlorinated paraffins, short chained
67663	Chloroform
	Phenols
9016459	Nonylphenolethoxylate and the degradation/transformation products
104405	Nonylphenol, 4-
	Xylenes
81152	Musk xylene
	Organic oxygen compounds
117817	Diethylhexylphthalate
84742	Dibutylphthalate
	Metallic compounds
7440439	Cadmium
7439921	Lead
7439976	Mercury
7782492	Selenium
	Pesticides/Biocides
106934	1,2-Dibromoethane
93765	2,4,5-T
107131	Acrylonitrile
309002	Aldrin
140578	Aramite
319857	beta-HCH
57749	Chlordane
143500	Chlordecone (Kepone)
6164983	Chlordimeform
50293	DDT
60571	Dieldrin
n.a.	Drins
72208	Endrin
7664393	Fluoroacetic acid and derivatives
608731	HCH
76448	Heptachlor
118741	Hexachlorobenzene
297789	Isobenzane
465736	Isodrin
4234791	Kelevan
143500	Kepone (Chlordecone)
58899	Lindane
2385855	Mirex
4636833	Morfamquat
1836755	Nitrophen
87865	Pentachlorophenol
82688	Quintozene
8001352	Toxaphene
n.a.	Organotin Compounds
	Polycyclic halogenated aromatic compounds
36355018	Hexabromobiphenyl
1336363	PCB
617883388	PCT (mixtures)
1746016	TCDD, PCDD, PCDF
	Polycyclic aromatic hydrocarbons
50328	PAH

These substances are highlighted in Appendix 2

Tab. 4: Substances (selected from the Rec. 19/5, Attachment, Appendix 3 list) for immediate priority action.

No.	Cas-No.	Substance	Group
1.	85535848	Chlorinated paraffins, short chained	Alkanes
2.	9016459	Nonylphenolethoxylate & degradation/transformation products	Phenols
3.	104405	Nonylphenol, 4-	Phenols
4.	1336363	PCB	
5.	7440439/n.a	Cadmium/compounds	Metals
6.	7439921/n.a	Lead/compounds	Metals
7.	7439976/n.a	Mercury/compounds	Metals
8.	7782492/n.a	Selenium/compounds	Metals
9.	Organotin	Organotin Compounds	
10.	106934	1,2-Dibromoethane	Pesticides
11.	93765	2,4,5-T	Pesticides
12.	107131	Acrylonitrile	Pesticides
13.	309002	Aldrin	Pesticides
14.	140578	Aramite	Pesticides
15.	319857	beta-HCH	Pesticides
16.	57749	Chlordane	Pesticides
17.	143500	Chlordecone (Kepone)	Pesticides
18.	6164983	Chlordimeform	Pesticides
19.	50293	DDT	Pesticides
20.	60571	Dieldrin	Pesticides
21.	72208	Endrin	Pesticides
22.	144-49-0	Fluoroacetic acid and derivates	Pesticides
23.	608731	HCH	Pesticides
24.	76448	Heptachlor	Pesticides
25.	118741	Hexachlorobenzene	Pesticides
26.	297789	Isobenzane	Pesticides
27.	465736	Isodrin	Pesticides
28.	4234791	Kelevan	Pesticides
29.	58899	Lindane	Pesticides
30.	2385855	Mirex	Pesticides
31.	4636833	Morfamquat	Pesticides
32.	1836755	Nitrophen	Pesticides
33.	87865	Pentachlorophenol	Pesticides
34.	82688	Quintozene	Pesticides
35.	8001352	Toxaphene	Pesticides

Tab. 5: Questionnaire for the substances (selected from the Rec. 19/5, Attachment, Appendix 3 list) for immediate priority action.

	No.	Question
1	1.1a	Legislation and other measures concerning chemical products
2	1.1b	Ban of the production/use of the substance
3	1.1c	Restricted use/import of the substance
4	1.1d	Use of economic instruments, voluntary agreements etc.
5	1.1e	Planned measures and activities for implementation
6	1.2a	Regulation of industrial installations (permits). Please, indicate date of implementation of regulations.
7	1.3a	Effectiveness of the implemented legislation/regulations
8	1.3b	Effectiveness of implementation of relevant HELCOM Recommendations
9	1.4a	Information on production, industrial and consumer uses of these substances, including relevant modes of applications
10	1.5a	Information on relevant discharges, emissions and losses from point sources and diffuse sources
11	2.1a	Amount of import/export, production per year
12	2.2a	Amount of substances in imported chemical products, articles and goods
13	2.3a	Amount of sales per year, specified for each use and mode of application
14	2.4a	Amount of stockpiling and its treatment of substances banned or restricted in use
15	2.5a	Information on the amount of discharges to water/emissions to air and losses (from production, use, storage, transport and waste treatment) within the catchment area of the Baltic Sea
16	2.6a	Information on illegal or unidentified uses (indication on such uses can be obtained e.g. from monitoring data)
17	2.7a	Amount of administrative and financial resources needed for the implementation and supervision of measures described under question 1.1. It is intended to get at least some rough estimation on these costs.

Tab. 6: Rough estimation whether the 50 % reduction goal has been reached by the Contracting Parties for the substances on the 50 % reduction list (HELCOM 12/18, Annex 6, 1991). For further explanations and detailed indormation please have a look at the national subchapters in chapter 3.

50 % reduction goal reached?	Den	Est	Fin	Ger	Lat	Lit	Pol	Rus	Swe
I. Metals and their compounds	air / water	air / water	air / water	air / water	air / water	air / water	air / water	air / water	air / water
Mercury	yes / yes	yes / yes	yes / yes	yes / yes		no / no info	no / yes	no info / yes	yes / no
Cadmium	no / yes	yes / yes	yes / yes	yes / yes		no / yes	no / yes	no info / yes	yes / yes
Copper	no / no info	no info	yes / yes	yes / yes				no info / yes	yes / no
Zinc	yes / no info	no info	yes / yes	yes / yes				no info / yes	yes / no
Lead	yes / yes	yes / yes	yes / yes	yes / yes		yes / no	no / yes	no info / yes	yes / yes
Arsenic	yes / no info	no info	yes / yes	yes / yes			yes / yes	no info / yes	yes / yes
Chromium	yes / no info	no info	no / yes	yes / yes				no info / yes	yes / no
Nickel	no / yes	no info	yes / yes	yes / yes				no info / yes	no / no
II. Organic substances other than biocides									
Carbontetrachloride			yes	yes			yes		
Chloroform									
Trichloroethylene	yes			yes					
Tetrachloroethylene	yes		yes	yes					yes
Trichlorobenzene				yes					
Dichloroethane 1,2-				yes			yes		
Trichloroethane 1,1,1-			yes	yes					
Xylenes									
Hexachlorobenzene		yes	yes	yes					
Hexachlorobutadiene			yes	yes					
Nonylphenolethoxylate				yes					yes
Dioxins				yes					
Halogenated org. sub. / AOX			yes	yes					
PAH				yes					
Tributyltin-compounds									
Triphenyltin-compounds									

50 % reduction goal reached?	Den	Est	Fin	Ger	Lat	Lit	Pol	Rus	Swe
Pentachlorophenol			yes	yes					
III. Biocides									
Trifluralin	yes			yes					yes
Endosulfan	yes		yes	yes				yes	yes
Simazine	yes		yes					yes	yes
Atrazine	yes			yes					yes
Tributyltin-compounds	yes								
Triphenyltin-compounds	yes								yes
Azinphos-ethyl	yes		yes	yes				yes	yes
Azinphos-methyl	yes			yes					
Fenitrothion	yes		yes	yes					yes
Fenthion	yes		yes	yes					yes
Malathion				yes					yes
Parathion-methyl	yes		yes	yes				yes	yes
Dichlorvos	yes		yes	yes				yes	yes
Copper-compounds				yes					
Zinc-compounds	yes			yes					
Arsenic-compounds	yes			yes					
Carbontetrachloride	yes			yes					yes
Chlorpicrin	yes		yes						yes
1,2-Dichloroethane	yes			yes					yes
Hexachlorobenzene	yes	yes	yes	yes	yes	yes	yes	yes	yes
Lindane	yes	yes	yes	yes	yes	yes	yes	yes	yes

*) “yes” is also indicated, when a substance has never been approved for use or is banned.

Tab. 7: Rough estimation whether the 50 % reduction goal has been reached by the Contracting Parties for the substances (selected from the Rec. 19/5, Attachment, Appendix 3 list) for immediate priority action. For further explanations and detailed indormation please have a look at the national subchapters in chapter 3.

50 % reduction goal reached?	Den	Est	Fin	Ger	Lat	Lit	Pol	Rus	Swe
Alkanes									
Chlorinated paraffins, short chained	yes		yes	yes					yes
Phenols									
Nonylphenolethoxylate & degr.-/transf.-products				yes					yes
Nonylphenol, 4-				yes					yes
Polycyclic halogenated aromatic compounds									
PCB	yes	yes	yes	yes					yes
Metals and compounds	air/water	air/water	air/water	air/water	air/water	air/water	air/water	air/water	air/water
Cadmium/compounds	no / yes	yes / yes	yes / yes	yes / yes		no / yes	no / yes	no info/yes	yes / yes
Lead/compounds	yes / yes	yes / yes	yes / yes	yes / yes		yes / no	no / yes	no info/yes	yes / yes
Mercury/compounds	yes / yes	yes / yes	yes / yes	yes / yes			no / yes	no info/yes	yes / no
Selenium/compounds				yes					
Pesticides									
1,2-Dibromoethane	yes	yes	yes	yes	yes	yes	yes	yes	yes
2,4,5-T	yes	yes	yes	yes	yes	yes	yes	yes	yes
Acrylonitrile	yes	yes	yes	yes	yes	yes	yes	yes	yes
Aldrin	yes	yes	yes	yes	yes	yes	yes	yes	yes
Aramite	yes	yes	yes	yes	yes	yes	yes	yes	yes
beta-HCH	yes	yes	yes	yes	yes	yes	yes	yes	yes
Chlordane	yes	yes	yes	yes	yes	yes	yes	yes	yes
Chlordecone (Kepone)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Chlordimeform	yes	yes	yes	yes	yes	yes	yes	yes	yes
DDT	yes	yes	yes	yes	yes	yes	yes	yes	yes
Dieldrin	yes	yes	yes	yes	yes	yes	yes	yes	yes
Endrin	yes	yes	yes	yes	yes	yes	yes	yes	yes
Fluoroacetic acid and derivates	yes	yes	yes	yes	yes	yes	yes		yes
HCH	yes	yes	yes	yes	yes	yes	yes	yes	yes
Heptachlor	yes	yes	yes	yes	yes	yes	yes	yes	yes
Hexachlorobenzene	yes	yes	yes	yes	yes	yes	yes	yes	yes

50 % reduction goal reached?	Den	Est	Fin	Ger	Lat	Lit	Pol	Rus	Swe
Isobenzane	yes	yes	yes	yes	yes	yes	yes	yes	yes
Isodrin	yes	yes	yes	yes	yes	yes	yes	yes	yes
Kelevan	yes	yes	yes	yes	yes	yes	yes	yes	yes
Lindane	yes	yes	yes	yes	yes	yes	yes	yes	yes
Mirex	yes	yes	yes	yes	yes	yes			yes
Morfamquat	yes	yes	yes	yes	yes	yes	yes	yes	yes
Nitrophen	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pentachlorophenol	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quintozene	yes	yes	yes	yes	yes	yes	yes	yes	yes
Toxaphene	yes	yes	yes	yes	yes	yes		yes	yes
Organotin compounds									

*) “yes” is also indicated, when a substance has never been approved for use or is banned.

Original data with regard to the 50 % reduction list submitted by the Contracting Parties

I. Denmark

Tab. Ia: Estimated consumption figures and total losses of cadmium [t].

	1980	1990	1996
estimated consumption [t]		50	43 - 71
total loss [t] to			
air	8	2	0.3 - 1.6
water	5	0.7	0.9 - 2
soil	9	5	2.2 - 3.5
deposited		31	12 - 25

Tab. Ib: Estimated total losses of lead [t].

total loss [t] to	**1985**	**1994**
air	250 - 300	11 - 33
water	400 - 560	160 - 190

Tab. Ic: Discharges, emissions and losses of mercury [t] from point and diffuse sources.

total loss [t] to	**1992/1993**	**1998**
air	1.9 - 2.5	2 *1)
water	0.5	0.5 *2)
soil	0.2 - 0.3	

*1) from point sources 0.5 t/y (industrial plants and municipal STPs (average of 1993 and 1998)

*2) 1997

Tab. Id: Yearly mean of background air concentration [ng/m^3] in 1989 and 1999.

Metal	**1989**	**1999**	**App. reduction (%)**
Cadmium	0.4	0.35	12
Copper	2.65	1.7	36
Zinc	35	14	60
Lead	20	5	75
Arsenic	1.45	0.5	66
Chromium	1.35	0.65	52
Nickel	2.2	1.5	32

Tab. Ie: Estimated emissions of metals from WWTP (data from 1994, 1998 and 1999).

Metal	**[t/a]**
Nickel	12
Zinc	70
Arsenic	9
Chromium	0.5

II. Estonia

Tab. IIa: Anthropogenic national annual emissions of heavy metals [t] 1990 - 1999 (all sectors).

Compound	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Lead	232.515	208.352	120.877	100.426	106.657	87.561	80.159	73.077	54.663	45.036
Cadmium	1.612	1.493	1.118	0.885	0.937	0.899	0.941	0.978	0.829	0.776
Mercury	1.292	1.183	0.980	0.750	0.798	0.751	0.778	0.773	0.664	0.611
Arsenic										
Chromium										
Copper										
Nickel										
Selenium										
Zinc										

Data: N. Kohv, Estonian Environmental Information Centre
Pb, Cd and Hg are the heavy metals referred to in article 3, paragraph 1, and in annex I to the 1998 Protocol on Heavy Metals. The rest are to be reported on a voluntary basis.

Tab. IIb: Use of heavy metal compounds by industrial enterprises [kg] 1995 - 1999

	1995	1996	1997	1998	1999
Lead	54778	111017	8108	2591	1065
Cadmium	17361	18035	114879	963	3

Tab. IIc: Residual stock of heavy metals in enterprises [t], 1995 - 1999

	1995	1996	1997	1998	1999
Lead	11.3	14.0	849.5	458.9	1028.5
Cadmium	35.2	82.9	7.5	11.8	13.2

Tab. IId: Generation of waste of heavy metals in enterprises [kg], 1995 - 1999

	1995	1996	1997	1998	1999
Lead	0	14	32	10003	20013
Cadmium	-	0	270	0.2	0.1

Environment 1999
Statistical Office of Estonia

III. Finland

Tab. IIIa: Sales figures for five substances for 1987 and 1999.

Substance	tonnes/1987	tonnes/1999
Azinphos-methyl	0.7	0.7
Endosulfan	3.4	0.0
Malathion	6.2	5.2
Simazine	10.0	4.3
Trifluralin	15.0	16.4

Tab. IIIb: Sales figures for arsenic, copper and chromium compounds used as wood preservatives.

Compounds	tonnes/1994	tonnes/1999
arsenic compounds (As)	310	592
chromium compounds (Cr)	580	863
copper compounds (Cu)	240	349

Tab. IIIc: Total metal emissions into air in 1990 and 1997.

Substance	tonnes/1990	tonnes/1997	reduction from 1990 to 1997 [%]
Arsenic	33.2	12.4	63
Cadmium	6.3	1.2	81
Chromium	31.6	18.7	41
Copper	94.4	27.4	71
Lead	326.1	20.8	94
Mercury	1.1	0.5	54
Nickel	67.0	20.8	69
Zinc	570.5	71.3	88

Tab. IIId: Metal emissions from industries into water in 1987, 1995 and 1999.

Substance	tonnes/1987	tonnes/1995	tonnes/1999	reduction from 1987 to 1999 [%]
Arsenic	3.0	1.5	0.7	82
Cadmium	0.6	0.2	0.1	83
Chromium	69.0	18.0	6.2	91
Copper	28.0	9.6	8.0	71
Lead	3.5	1.6	0.2	94
Mercury	0.06	0.04	0.02	67
Nickel	56.0	17.0	12.0	79
Zinc	193.0	71.0	28.0	85

Tab. IIIe: Metal discharges from the municipal sewage plants situated on the coast of the Baltic sea in 1987 and 1995.

Compounds	tonnes/1987	tonnes/1995
Cadmium	0.06	0.008
Lead	1.0	0.4
Mercury	u.d.l.	u.d.l.

u.d.l. = under detection limit

Tab. IIIf: Total release of cadmium [t/y] into the environment in 1987

Source category	Air	Water	Land
Zinc mines	-	0.02	0.7
Zinc plant	0.85	0.13	124*
Copper smelter	1.46	0.28	0.04
Secondary metal industry	0.007	0.004	0.11
Car & other scraps	0	0	8.00
Foundry	0.056	-	-
Iron & steel industry	0.424	0.016	-
Cement industry	0.017	0	-
Tyre wear	0	0	0.243
Electroplating industry	0	0.006	0.004
Fuel combustion	0.38	-	1.39
Phosphate fertilizers and gypsum	0.003	-	0.911
Other chemical plants	0	0.522	0
Household waste	0	0	0.900
Ni-Cd batteries	0	0	9.6
Refuse incineration	0.024	-	0.94
Sludge from waste treatment plant	0	0.015	0.434
Total	3.22	0.99	23.27+124= 147.27

*Cd in jarosite "-" = Not Known

IV. Germany

Tab. IVa: Calculated point source discharges in the entire German Baltic Sea Catchment Area

HELCOM list of priority harmful substances (1998)	**Total discharge in the German Baltic Sea coastal areas [kg/a]*1)**	**Total discharge in the German Oder catchment area [kg/a]*2)**	**Total discharge in the German Baltic Sea catchment area [kg/a]**
Metals			
Mercury	0.012	< LQ*	**0.012**
Cadmium	0.02	16.8	**16.8**
Copper	2247	223	**2470**
Zinc	10300	13400	**23700**
Lead	10.0	319	**329**
Arsenic	1.4	55.2	**56.6**
Chromium	18.0	116.0	**134**
Nickel	816	444	**1260**
Organic Substances			
Chloroform	24.6	< LQ*	**24.6**
Trichlorethylene	1.01	< LQ*	**1.01**
Tetrachlorethylene	56.7	2.3	**59.0**
Nonylphenolethoxylate			
Nonylphenolmonoethoxylate	74.9	3.6	**78.5**
Nonylphenoldiethoxylate	< LQ*	8.58	**8.58**
AOX	5110	7990	**13100**
PAH	0.87	1.95	**2.82**
Pentachlorophenol	6.74	6.95	**13.7**
Biocides			
Trifluralin	0.596	0.397	**0.993**
Simazine	20.2	6.86	**27.1**
Atrazine	3.43	2.29	**5.72**
Dichlorvos	47.2	< LQ*	**47.2**
gamma-HCH (Lindane)	8.32	1.64	**10.0**

* < LQ: Some of the concentrations are above the respective LQ. The mean concentration value is however below the LQ value. There are thus no data. Concentrations below the LQ were always considered to be half of the LQ value.
*1)Point sources in Mecklenburg-Western Pomerania and Schleswig Holstein)
*2)Point sources in Brandenburg and Saxony)

Tab. IVb: Environmental release estimates for short-chained chlorinated paraffins (SCCP) to water.

Application	SCCP - releases [t/a] based on sales figures of 1994 within the EU as prepared in the UK EU risk assessment.	SCCP - releases [t/a] based on sales figures of 1998 within the EU considering release factors used in risk assessments of SCCP and MCCPs, prepared by the UK in 1998 and 1999, respectively.
Production	45	15
PVC Plasticisers	-	25 kg/a *
Metal working lubricants	23.45	5,045
	1688	363
Paints, adhesives and sealants	negligible	5**
Rubber/flame retardants/	< 12 kg/a	0.4***
textile/polymers (other than PVC)	negligible	negligible
Leather fat liquors	7,8	0.9
	19,5	2.25
Other	not considered	Production: 13****
		Formulation: 13
		Processing: 324
Total	1784	742

* only compounding and conversion considered
** service life of PVC and paints, adhesives and sealants
*** derived from MCCP risk assessment
**** default estimates according to the TGD

V. Latvia

Tab. Va: Heavy metal emissions [t/a] for 1990 and 1995.

Metal	Emissions [t] in 1990	Emissions [t] in 1995	Reduction [%]
Pb	20*	4.7*	76
Cd	2.5	1.4	44
Hg	0.37	0.17	54

* only for stationary sources

VI. Lithuania

Tab. VIa: Amount of lead discharges and emissions [kg/a]

	1990	1995	1996	1997	1998
Discharges of Pb [kg/a]	no info.	200	400	200	600
Emission of Pb [kg/a]					
Stationary Sources	7539.32	3369.94	3560.0	2921.8	3851.96
Large Combustion plants	3463.2	1837.16	1918.67	1526.33	2001.6
heavy oil	3463.2	1837.16	1918.67	1526.33	2001.6
Small appliances	2701.04	779.66	718.02	609.24	541.06
coal	2504.0	698.0	637.0	496.0	425.8
wood combustion	27.36	37.72	44.1	87.58	97.12
diese oil+light fuel oil	169.68	43.94	36.88	25.66	18.14
Industry	1375.08	753.12	923.4	786.24	1309.25
cast iron foundries	761.76	123.84	115.2	149.76	151.85
cementproduction	20.4	3.6	4.2	4.2	4.7
glass production	592.9	625.68	804.0	632.28	1152.7
Mobile sources	51690.0	26852.0	14202.3	16387.0	17740.0
Road traffic	46040.0	24338.0	117786.3	14543.0	15954
gasoline	40350.0	20038.0	6644.3	6391.0	6162.0
diesel fuel	5690.0	4300.0	5142.0	8152.0	9792.0
Other traffic	5650.0	2514.0	2416.0	1844.0	1786.0
Total emissions	59229.32	30221.94	177762.39	19308.81	21591.96

Tab. VIb: Emissions of mercury [kg/a]

Emission of Hg [kg/a]	1990	1995	1996	1997	1998
Combustion activities	307.34	146.82	154.60	228.24	239.31
Large Combustion plants	27.26	8.56	8.99	8.44	-
natural gas	27.26	8.56 (12)	8.99	8.44	6.799
Small appliances	280.08	138.26	145.61	219.8	232.56
coal	225.36	62.82	57.33	44.64	38.32
wood combustion	54.72	75.44	88.28	175.16	194.24

Tab. VIc: Amount of cadmium discharges and emissions [kg/a]

	1990	1995	1996	1997	1998	Red. [%]
Discharges of cadmium into surface water bodies [kg/a]	no info.	30.0	no info.	no info.	9.4	
Emissions of Cd [kg/a]						
Stationary Sources	3016.3	1566.5	1645.8	1423.43	1835.451	
Large Combustion plants	6	1413.2	1475.9	1174.1	1539.7	
Small appliances	2664.0	110.8	119.7	198.9	213.6	
Industry	184.7	42.5	50.1	50.3	70.98	
cast iron foundries	167.5	2.4	2.2	2.9	6.3	
cement production	14.8	24.0	28.0	28.0	31.5	
phosphate fertiliser	136.0	8.3	9.8	11.58	33.18	
glass production	9.3	7.8	10.0	7.9	14.4	
Mobile sources	7.4	547.9	611.7	571.6	619.532	
Road traffic	902.6	444.0	490.6	499.7	486.63	
gasoline	749.2	433.2	477.75	479.32	462.15	
diesel fuel	735.0	10.75	12.8	20.3	24.48	
light duty vehicle (emissions from tyre)(gasoline)	14.2	32.09	35.38	7.9	34.28	
heavy duty vehicle (emiss. from tyre)(diesel fuel)	30.6	65.5	79.72	59.3	94.15	
Other traffic	108.6	6.2	6.0	4.6	4.47	
Total emissions	3918.9	2114.5	2257.5	1995.0	2454.983	37
Sludge from municipal waste water treatment:						
Total amount [t/a]	no info.	458000	no info.	no info.	486000	
Cd-content (mg/kg dry weight)		3-87			3-106	

VII. Poland

Tab. VIIa: Riverine loads [t] discharged to the Baltic Sea.

Parameter	1987* t/a	1995 t/a	Reduction [%]
Hg	74	9.28	87.5
Cd	46	8.99	80.5
Pb	411	124.66	70
DDT	0.40**	0.15	62

* loads in monitoring period (hydrological year) 1 November-31 October
**in 1990, no information for 1987

Tab. VIIb: Total air emissions [t/a] of heavy metals (estimations according to CORINAIR):

Parameter	1990 t/a	1995 t/a	Reduction [%]
Hg	33.3	32.3	3
Cd	91.6	82.6	9.8
Pb	1371.7	936.6	32

VIII. Russia

Tab. VIIIa: Discharges of heavy metals [t/a] from St. Petersburg into the Gulf of Finland for 1989 – 1999.

	Cd	Pb	Hg	Cu	Zn	Cr	Ni
1989	0.01	41.2	-	108.9	237.3	68.8	41.6
1990	2.34	67.8	12.14	92.1	229.2	57.2	43.2
1991	0.43	57.2	9.24	88.9	236.3	64.7	58.3
1992	8.66	49.6	6.57	68.7	164.3	10.1	42.2
1993	4.19	29.6	0.99	66.6	304.1	76.5	45.1
1994	2.88	18.0	0.56	28.5	256.0	23.5	26.4
1995	1.0	10.8	0.115	20.4	149.0	14.3	15.7
1996	1.6	5.33	0.046	14.5	135.0	12.9	10.1
1997	0.8	4.37	0.132	12.1	93.6	6.07	9.94
1998	0.32	4.7	-	11.9	74.1	5.34	11.3
1999	0.34	4.34	-	14.0	80.0	5.83	13.9
Reduction [%] 90-99	**85**	**93**	**99**	**85**	**65**	**90**	**68**

IX. Sweden

Tab. IXa: Discharges/emissions of metals and their compounds [kg/y] for the years 1987 to 1995.

		Discharges/ emissions [kg/y]				Major sources and Reduction [%]	Comments
		1987	**1990**	**1992**	**1995**		
Mercury	Water	240	120	190	130	Municipal waste water (45)	no river transport included
					730	Riverine input	
	Air	3500	1500	1700	880	Industrial sources (75)	
Cadmium	Water	380	830[*1)]	260[*2)]	135	[*1)]Indust., [*2)]municipal sources (64)	no river transport included
			1860	2190	1640	Riverine input (12)	
	Air	3000	2000	2500	780[*1)]	[*1)]Industrial sources (74)	
Copper	Water	26000	20000	10700	11100	Municipal waste water (57)	no river transport included
			271900	248300	298700	Riverine input (+ 10)	
	Air	55000	27000	26000	9800	Metal works for 1995 (82)	
Zinc	Water	65000		28100	28500	Industrial sources and municipal waste water (56)	no river transport included
			1175600	1256700	1417400	Riverine input (+ 20)	
	Air	360000	230000	228000	140000	Industrial sources (61)	
Lead	Water	6300	7700	2800	2600	Equal shares industrial and municipal waste (59)	no river transport included
			45400	42800	22800	Riverine input (in 1998 input was back to 59000)	
	Air	360000	540000	540000	38000	Mainly traffic (89)	
Arsenic	Water	9900	9000			Industrial sources	
	Air	14000	6000	6000	1300	Industrial sources (91)	
Chromium	Water	2500		3700	1430	Municipal waste water (43)	
					41700	Riverine input (1996)	
	Air	45000	23000	23000	14000	Industrial sources (69)	
Nickel	Water	7700		6300	5400	Municipal waste water (30)	
					117000	Riverine input (1996)	
	Air	45000	26000	25000	32000	(29)	

Tab. IXb: Production/import volumes of chlorinated paraffins [t/y]?

Use area	**1990**	**1995**	**1998**	**Reduction [%] (1990-1998)**
Metal working	500	40	41	91.8
Cables	n.d.	n.d.	0	
Floors	n.d.	n.d.	0	
Paint	200.	6	16	92.0
Sealing compounds	n.d.	2	2	
Total	**630**	**48-**	**59-**	**90.6**

Source: KemI Report 6/97, complemented with recent data from KemIs Products register and contacts with industry.

Tab. IXc: Production/import volumes of Nonylphenolethoxylates [t/y] reported to the Swedish Product Register.

Use area	1990	1995	1997	1998	Reduction [%] (1990-1998)
Polymerisation*	500	450	210	200	60.0
Paint and coatings	n.d.	200	92	13	93.5
Metal working liquids	n.d.	20	15	10	50.0
Industrial cleaning	2,400	25	5	2	99.9
Pulp & paper	n.d.	50	26	39	22.0
Pesticides	n.d.	4	8	11	increase!
Other uses	n.d.	100	24	25	75.0
Total	**3,000-3,500**	**850**	**380**	**300**	**90.0**

Source: Kemi Products Register. * including manufacturing of paint

Tab. IXd: Use volumes of cadmium in different areas [t/y].

Use area	1980	1985	1990	1995	Reduction [%] (1990-1998)
Pigments	7	0.5	0.5	0.5	93
Stabilisers	30	9	2	0	100
Plating	20	2	2	0.5	98
Ni-Cd-batteries	39	44	101	93	

Source: Kemi Report 1/98

Tab. IXe: Estimated main uses of lead [t/y] in production.

Use area	1989/90	1992	1996	Reduction [%] (1990-1996)
Accumulators	22,000	22,000	35,800[1]	
Lead sheathed cables	3,000	< 3,000	1225[2]	59
Plastics, stabilisers and pigment	2,000	2,000	< 900[3]	55
Crystal glass	1,500	1,320	< 900	40
Lead shots and other ammunition	800-900	1,200	< 1,000[4]	
Petrol	600	340	< 9[5]	98
Paint and rust preventives	200	90	70[6]	65
Fishing tools (/sinkers)	n.d.	600	132[1]	78
Weights (car wheels, boat keels)	n.d.	1,000	2,000[1]	
Electronics	n.d.	1,300	1,300	0

Source: Kemi report 6/97

[1] Figure without regard to import and export.
[2] The amount of lead to the Swedish market is estimated to less than 10 tonnes.
[3] Figure for 1994.
[4] Sale figure, assuming no change of lead content in bullets
[5] Figure for 1995 and 1996
[6] Figure for 1995

Tab. IXf: Emissions of mercury by point sources to air [t/y].

Branch	1985	1988	1990	1995	Reduction [%] (1985-1995)
Mines	0.2	0.1	0.04	0.01	95
Metal works	1.0	0.4	0.25	0.07	93
Iron/steel work	0.7	0.2-0.7	0.27	0.11	84
Chloralkali ind.	0.4	0.3	0.2	0.12	70
Coal/wood incineration	0.2	0.3	0.21	0.10	50
Oil incineration		0.01		0.10	
Waste incineration	1.5	0.8	0.2-0.25	0.09	94
Crematories	0.3	0.3	0.3	0.28	7

SEPA report 1999

List of abbreviations

AOX	Adsorbable Organic Halogens
APEO	Alkylphenolethoxylates
Cd	Cadmium
CEFIC	European Chemical Industry Council
CPs	Contracting Parties
DDT	Dichlorodiphenyltrichloroethane
Den	Denmark
e.g.	exempli gratia / for example
EIA	Environmental Impact Assessment
Est	Estonia
EU	European Union
Fin	Finland
Ger	Germany
HARP-HAZ	Harmonised Quantification and Reporting Procedures for Hazardous Substances
HCH	Hexachlorocyclohexane
HELCOM	Helsinki Commission (Baltic Marine Environment Protection Commission)
Hg	Mercury
HM	Heavy metals
KEMI	Swedish National Chemicals Inspectorate
kg	Kilogram
Lat	Latvia
LD	List of Decision
Li-ion	Lithium ion
Lit	Lithuania
m	Metre
MCCP	Medium Chained Chlorinated Paraffins
n.a.	not available
NEAP	National Environmental Action Plan
NES	National Environmental Strategy
NiCd	Nickel-Cadmium
NiMH	Nickel-Metalhydrid
NP/NPE	Nonylphenol/Nonylphenolethoxylates
OSPAR	Oslo and Paris Commissions
PAH	Polyaromatic Hydrocarbons
Pb	Lead
PCB	Polychlorinated Biphenyls
PCDD	Polychlorinated dibenzo-p-dioxins
PCDF	Polychlorinated dibenzofurans
PCP	Pentachlorophenol
PCT	Polychlorinated Triphenyls
Pol	Poland
POP	Persistent Organic Pollutants
PVC	Polyvinyl Chloride
Rec.	Recommendation
Rus	Russia

SCCP	Short Chained Chlorinated Paraffins
SEPA	Swedish Environment Protection Agency
Swe	Sweden
t	Ton
TBT	Tributyltin
TC	Technological Committee
UN/ECE	United Nations Economic Commission for Europe
WGS	Working Group on Criteria and Standards
WWF	World Wide Fund for Nature
WWTP	Waste Water Treatment Plant
y	year