Background study

Project ‘Baltic actions for reduction of Pollution of the Baltic Sea from Priority Hazardous substances’

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Contents

ABBREVIATIONS

AA-MAC	Maximum allowable concentration expressed as an annual average value
Ag	Silver
Al	Aluminium
As	Arsenic
BAT	Best Available Technologies
BCF	Bioconcentration factor
BEP	Best Environmental Practices
BFR's	Brominated flame retardants
BOD	Biological Oxygen Demand
BREF	Best Available Technique Reference documents
BS	Baltic States
BSAP	Baltic Sea Action Plan
CAS	Chemical Abstracts Service
Cd	Cadmium
CLP	Classification & Labeling & Packaging
CMR	Carcinogenic, mutagenic, toxic for reproduction
COD	Chemical oxygen demand
COMMPS	Combined monitoring-based and modelling-based priority setting
Cr	Chromium
Cu	Copper
DBP	Dibutyl phthalate
DBT	Dibenzothiophene
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloro-ethylene
DDT	Dichlorodiphenyltrichloroethane
BDPE	Polybrominated diphenyl ether
DEHP	Bis(2-ethylhexyl)phthalate
DG	Directorate-General
DSD	Dangerous Substances Directive
EC	European Commission
ECB	European Chemicals Bureau
EINECS	European INventory of Existing Commercial chemical Substances
EIPPCB	European IPPC Bureau
ELINCS	European LIst of Notified Chemical Substances
EQS	Environmental quality standards
ESR	Existing Substances Regulation
EU	European Union
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
HBCDD	Hexabromocyclododecane
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane
HELCOM	Convention on the Protection of the Marine Environment of the Baltic Sea Area
Hg	Mercury
HPVCs	High Production Volume Chemicals
HS	Hazardous substances
IPPC	Integrated pollution prevention and control
IUCLID	International Uniform Chemical Database
LEGMA	Latvian Environment, Geology and Meteorology Agency
LOD	Limit of detection
Kow	Water/ octanol partition coefficient
LPVCs	Low Production Volume Chemicals
MAC	Maximum allowable concentration
MCCP	Medium chain chlorinated paraffin
Mn	Manganese
MoE	Minsitry of Environemnt
MONAS	Monitoring and Assessment Group
MS	Member State
Ni	Nickel
NOEC	No Observed Effect Concentration
NP	Nonylphenol
NPEOS	Nonylphenolethoxilates
OECD	Organisation for Economic Co-operation and Development
OP	Octylphenol
OPEOS	Octylphenolethoxilates
OSPAR	The Convention for the Protection of the marine Environment of the North-East Atlantic
PAH	Polyaromatic Hydrocarbons
Pb	Lead

PBBs	Polybrominated biphenyls
PBDE	Polybrominated Biphenyl ethers
PBT	Persistent, bioaccumulative and toxic pollutants
PCB	Polychlorinated Biphenyls
PCP	Pentachlorophenol
PCT	Polychlorinated biphenyl
PER	Perchlorethylene
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonates
POPs	Persistent organic pollutants
REACH	Registration, evaluation and authorisation of chemicals
SCCP	Short chain chlorinated paraffin
Sn	Stannum
SVHC	Substances of very high concern
TBBPA	Tetrabromobisphenol A
TBT	Tributyltin
TCB	Trichlorobenzene
TGD	Technical Guidance Documents
TPhT	Triphenyltin
TRI	Trichlorethylene
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
VOC	Volatile organic compounds
vPvB	very Persistent and very bioaccumulative pollutants
WFD	Water Framework Directive
WWTP	Waste water treatment plants
Zn	Zinc

1. INTRODUCTION TO THE STUDY

The background study is prepared under the project entitled: "BALTIC ACTIONS FOR REDUCTION OF POLLUTION OF THE BALTIC SEA FROM PRIORITY HAZARDOUS SUBSTANCES – BaltActHaz. The main goals of the BaltActHaz project is to support Baltic States in implementing the EU Water Framework Directive, the IPPC Directive and the coming Marine Directive as well as the new HELCOM Baltic Sea Action Plan with regard to reduction of hazardous substances. One of the actions for reaching the goal is to compile background information and set the frame for a common understanding of the EU Hazard Concept.

Due to economic activities of the human society, various chemical substances have been released to the environment. Some of these substances, once released, stay in the environment for very long time due to their persistence. If they are also bio-accumulative, they accumulate via the food chain. If toxic, they exert harmful effects to the living organisms – plants, animals, humans. These so called PBT substances can be transported very long distances from the original emission source and they eventually can occur anywhere. Furthermore, if persistent substances cause an effect, the exposure will continue for a long period. The effects are practically irreversible. The ecosystems are not able to recover, e.g. the ecosystem of the Baltic Sea is suffering from the level of contamination and also humans are exposed to these substances via the food chain. When hazardous substances accumulate in organisms and food chain, concentrations in the bodies may exceed levels above which adverse effects occur. Exposure to toxic substances can cause death and illness including disruption of the endocrine, reproductive and immune system, neurobehavioral disorders and cancer possibilities occur. The problem of hazardous substances in the aquatic environment has reached alarming dimension since longer time and it seems not yet to be solved: information and data on uses of these substances are still scattered and all obliged parties report lack of information about occurrence of substances and sources.

In the scope of this study the project the team has compiled information about the occurrence of the target substances in the three target countries Estonia, Latvia and Lithuania – mostly refreshing its knowledge from previous activities and updating on newest developments. There is also overview on the legal requirements in each of the three countries addressing hazardous substances. It is also important to address developments regarding hazardous substances on EU level.

The principles of substances environmental concern is presented in Chapter 2 of the study. Chapter 3 describes the legal acts relevant for the purpose of managing water and hazardous substances. It gives overview on objectives of these legal acts and main obligations to countries. Finally it also outlines new upcoming legal acts regard hazardous substances and water environment. Chapter 4 describes occurrence of the target substances in the Baltic States, analysing generally the occurrence of hazardous substances in products and presenting pervious findings on substances in water. Overview about Baltic states monitoring programmes are given in Chapter 5. How the hazardous substances are addressed in permitting systems in countries is described in Chapter 6 of the report. Finally the Chapter 7 outlines the on-going projects in EU level regards hazardous substances management. The study paper has two annexes containing list of national legal acts and relevant lists of hazard substances.

The study will form a necessary background for further activities directly targeting objectives of the WFD and Member States obligations under it. Furthermore it will serve for public information.

2. HAZARDOUS SUBSTANCES

What are hazardous substances and why is it important to know about them?

The various (legal) frameworks explain and define "hazardous substance" differently. It is important to be clear on which definitions exist and which is applied in the concrete work situation. In principle, being "hazardous" is a consequence of one or more intrinsic properties of a substance. "Environmentally hazardous" is a subset of "hazardous".

The focus of this report is primarily on substances that are defined as environmentally hazardous. Lists of these substances are presented in Annex 2.

2.1. WHICH SUBSTANCES ARE OF RELEVANCE FOR THE ENVIRONMENT?

Environmental damage is regarded as any impairment of the functioning of ecosystems. This means that those adverse effects of chemicals are relevant, which threaten the stability of an entire population of micro-organisms, plants and animals, e.g. by weakening the immune system, disturbing reproduction or inhibiting photosynthesis. Adverse effects on single organisms are not important, because of nature's ability to regenerate itself.

Environmentally hazardous substances can cause **acute and chronic effects**:

- *Acute toxicity* has a short exposure time, substance "disappears" and only individuals are killed, normally higher concentrations needed to show an effect.
- *Chronic toxicity* has a long term exposure or repeated exposure time; lower concentrations could cause an effect; substance is present in the environment and/or organisms for a longer time => PBT. Chronic effects occur after long term exposure, lower doses.

Acute effects are less relevant for the marine environment; many chronic effects are related to reprotoxicity/endocrine disruption. Effects are identified by testing (biotests, etc.)

Substances cause effects if they are present in concentrations in the environment or in biota that exceed their specific effect threshold. As the environment "destroys" and "dilutes" substances, only substances which are persistent and which have a potential to bioaccumulate are of particular relevance for the environment.
Some substances are subject to long range transport, because of their physico-chemical properties. This means they are transported mainly via the atmosphere to any location in the world, including remote areas and pristine environments. The later are of high environmental value, as they are largely untouched and undisturbed. To protect these areas, these substances (persistent organic pollutants – POPs) are of highest concern for the environment.

Persistent, bioaccumulative, toxic (PBTs) and very persistent and very bioaccumulative (vPvBs) pollutants are long-lasting substances that can build up in the food chain to levels that are harmful to human and ecosystem health. These contaminants can be transported long distances and move readily from land to air and water. Because of their persistence and bioaccumulative properties, they do not break down easily and are particularly difficult to clean up.

Persistent	Bioaccumulative	Toxic
Some substances are very persistent in the environment, with lifetimes from decades to centuries. The molecular structures of these compounds allow them to resist the natural fate processes in the atmosphere, waters, and biota that break down other pollutants.	Substances that concentrate in fatty tissue tend to build up to much higher concentrations in humans and other organisms. They are also more likely to transfer and accumulate up the food chain.	Laboratory, field, and epidemiologic research indicate that some substances cause or are suspected to cause adverse effects to humans and wildlife in ways that range from minor skin irritations to cancer. Women and children have been found to be particularly susceptible to the effects of some PBT compounds. In addition, wildlife exposure to PBT substances is of significant concern, particularly for species at the upper levels of the food chain (e.g., carnivores such as polar bears that consume seals).

Humans may be exposed to hazardous substances via the environment through the food chain. By consuming animal and plants products hazardous substances may build up further in the human body and eventually reach concentrations which cause health damage. Therefore, substances with the potential for long-term adverse effects on human health (such as CMRs) are also of relevance, when dealing with substances in the frame of environmental protection.

Based on the above considerations, hazardous substance with relevance for the environment are substances which are **persistent and bioaccumulative and toxic** to the aquatic environment or human health. Substances considered legally hazardous (classification criteria adopted by legislation, e.g. GHS) because of their physico-chemical properties, because they cause acute effects on human health or the environment, or which are readily degradable or don't bioaccumulate are excluded.

2.2. DEFINITIONS OF HAZARDOUS SUBSTANCES

The various frameworks dealing with hazardous substances have different understandings and criteria to select the substances they aim to regulate. Furthermore, they name the substances they cover differently. From the perspective of the environment, the following frameworks are relevant: The EU chemicals regulation REACH, the Water Framework Directive (WFD) and the Marine Conventions HELCOM and OSPAR, as well as the international agreement on POPs (mentioned frameworks are described in the chapter 3 of this paper).

International frameworks talk about:

- Dangerous = hazardous in normal use of language.
- The EU system for classification and labelling of chemicals uses the term „dangerous" substance.
- The Globally Harmonised System (GHS) for classification and labelling uses the term „hazardous" substance instead of "dangerous".
- In the context of OSPAR, HELCOM and the EU Water Framework Directive (WFD) "hazardous" indicates that the substance is likely to be persistent, liable to bio-accumulate and toxic (PBT), or is of an equal level of concern.
- In the EU BREF documents the terms "harmful" and "hazardous" are used in a general meaning.
- REACH introduces the concept of "substances of very high concern", and defines PBT/vPvB as one type of such substances.

In addition, the numerical values applied to determine whether a substance meets criteria of being on (very) high concern are slightly different under the different frameworks. The table 1 gives an overview of the differences of criteria.

Table 1: Criteria for (environmentally) „hazardous substances" in different frameworks

Criteria Framework	"Name" of hazardous substances	Criteria persistence	Criteria bioaccumulation	Criteria toxicity	Other criteria and comments
GHS	Hazardous substance	Not readily degradable	BCF ≥ 500 (log Kow ≥ 4)	(acute < 1 mg/l) Chronic < 100 mg/l	Any property leading to the classification of any of the hazard classes of the GHS
REACH PBT	Persistent, bioaccumulative and toxic substances	Not inherently degradable or $DT_{50,\ water}$ [60] 40d $DT_{50,sed}$ [180] 120d $DT_{50,\ soil}$ 120d	BCF > 2000	NOEC < 0.01 mg/l or C or M (cat 1&2) or R (cat 1,2 &3) Long term exposure could cause damage to health (R48)	
REACH vPvB	Very persistent and very bioaccumulative substances	Not inherently degradable or $DT_{50,water}$ > 60d $DT_{50,sed}$ > 180	BCF > 5000	-	
REACH SVHC	Substances of very high concern	See REACH PBT and vPvB	See REACH PBT and vPvB	Carcinogenic, mutagenic or reprotoxic category 1 or 2	Substances for specific assessment shows scientific evidence of probable serious effects giving rise to equivalent concern
UN POPs	Persistent organic pollutant (dirty dozen)	Half-life in water > 2 months or in sediment/soils > 6 months	BCF > 5000 or log K_{ow} > 5 or monitoring data in biota	Evidence of adverse effect on health or environment or toxicity characteristics indicating damage to health or environment	Long range transport: Measured levels far from source or monitoring data in remote area or multi-media modelling evidence and half-life in air > 2 days
UN ECE POPs	Persistent organic pollutant	Half-life in water > 2 months **or** in sediment or soils >6 months	BCF > 5000 or log K_{ow} > 5	Potential to adversely affect human health and/or environment	Long range transport: Vapour pressure < 1000 Pa and half-life in air > 2 days or monitoring data in remote area
WFD	(List of) Priority and priority hazardous substances	Risks to human health and the environment		Taking account of prioritized substances in EU risk assessments and frameworks.	
HELCOM	List of potential substances of concern. List of substances selected for immediate priority action.	Found in one or more compartments. Reach, or are likely to reach, the marine environment.	Indications of risks for the marine envi-ronment or human health via food	General threat to the aquatic environment due to hazardous properties.	Other concerns are synergistic effects, degradation to PBTs or synergistically acting substances and "other concerns", such as endocrine disruption
OSPAR	OSPAR List of substances of	Half-life ($T_{½}$) of 50 days	log K_{ow}>=4 or BCF>=500	T_{aq}: acute $L(E)C_{50}$=<1 mg/l,	Substances giving rise to similar

Criteria Framework	"Name" of hazardous substances	Criteria persistence	Criteria bioaccumulation	Criteria toxicity	Other criteria and comments
	potential concern. OSPAR List of chemicals for priority action.			long-term NOEC=<0,1 mg/l or $T_{mammalian}$: CMR or chronic toxicity	concern may also be included (e.g. endocrine disrupters)

In HELCOM and Water Framework directive are included lists of certain groups of substances like heavy metals, PBTs, vPvBs, and substances of similar concern. The criteria for environmentally hazardous substances in HELCOM are identical with criteria in REACH regulation but there are not mentioned numeric values (cut-offs) neither in HELCOM nor in WFD.

Under REACH there are given concrete criteria for identification of CMR, PBT and vPvB substances explicated in numerical limit values (criteria for hazardous substances included in HELCOM and WFD are more superficial in comparison with REACH where are given more understandable and concrete figures for identification these hazardous substances for environment such criteria like BCF, LD_{50}, $DT_{50,}$ etc.

The WFD prioritises substances posing risks to and via the environment, hence environmental and human health hazards are considered. There are no separate criteria and cut-off values for determining priority (hazardous) substances. The Commission is to propose substances based on conclusions of EU risk assessments. Decisions are taken by the Member States.

Lists of substances of high environmental concern are presented in Annex 2.

3. RELEVANT LEGAL ACTS

Depending on the goals and media to be protected, there could be different criteria applied as to what is regarded as a hazardous substance. Therefore, when addressing hazardous substances, it is important to define according to which criteria the decision is taken as to whether or not the substances should be regarded as hazardous according to this particular legislative framework.

These frameworks also prioritise those hazardous substances for which immediate actions are needed; this is a political decision. Comparing these different regulatory acts or international agreements, one can see that sometimes the same substances have been prioritised in several frameworks.

In this chapter relevant frameworks related with hazardous substances reduction are introduced:

- EU Water Framework Directive
- EU Marine strategy
- EU chemicals safety legislation (GHS, classification & labelling, REACH)
- List of conventions (HELCOM, Stockholm, OSPAR, Rotterdam)

At the end of this chapter there is also brief overview about upcoming legislation in EU to regulate hazardous substances.

3.1. WATER FRAMEWORK DIRECTIVE

The Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy, in short, the **EU Water Framework Directive** (WFD) adopted in 23 October 2000.

The Water Framework Directive establishes a management structure for future European water policy, with the following **main objectives**:

- expanding the scope of water protection to all waters, surface waters and groundwater;
- achieving "good status" for all waters by a certain deadline;
- water management based on river basins;
- "combined approach" of emission limit values and quality standards;
- getting the prices right: charges for water and waste water reflecting the true costs;
- getting the citizen involved more closely;
- streamlining legislation.

The **purpose** of Water Framework Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. There are separate environmental objectives regarding to surface waters.

The main objectives for surface waters related with hazardous substances are:

- MS shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water.
- MS shall protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status at the latest 15 years from the date of entry into force of this directive.

- MS shall implement the necessary measures with the aim of progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances without prejudice to the relevant international agreements.

The Framework Directive complement and complete other key pieces of water-related legislation: in particular, the directives on urban waste water treatment and on nitrates pollution from agriculture, the body of rules governing the authorization and use of pesticides and biocides, as well as the directive on integrated pollution prevention and control (IPPC). EC directive 2008/105/EC on environmental quality standards in the field of water policy lays down environmental quality standards (EQS) for priority substances and certain other pollutants. Directive on EQS was adopted on 16 December in 2008. The aim is to achieve good surface water chemical, in accordance with the objectives specified in article 4 of the Directive above-mentioned.

The Dangerous Substances Directive (DSD) 76/464/EEC and daughter directives on hazardous substances (86/280/EEC, 88/347/EEC and 90/415/EEC) **will be repealed by the Water Framework Directive (WFD) from December 2013**. 86/280/EEC and other HS directives (Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC) **shall be repealed with effect from 22 December 2012**. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with **EQS Directive by 13 July 2010**.

The Directive "Commission Directive laying down, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, **technical specifications for chemical analysis and monitoring of water status**" lays down technical specifications for chemical analysis and monitoring of water status in accordance with Article 8 (3) (Monitoring of surface water status, groundwater status and protected areas) of Directive 2000/60/EC (WFD). It establishes minimum performance criteria for methods of analysis to be applied by Member States when monitoring water status, sediment and biota, as well as rules for demonstrating the quality of analytical results. Draft Directive determines methods for analysis, minimum performance criteria for methods of analysis, calculation of mean values, quality assurance and control, in overall setting the guidelines based on ISO standards.

Hazardous substances

The Water Framework distinguishes between priority substances for which a progressive emission reduction is aimed at and priority hazardous substances for which the ultimate aim is the cessation or phasing out of emissions, discharges and losses. Priority substances are identified as substances causing a risk to or via the environment. The risk may be identified by EU risk assessment or by a simplified assessment, using a) ecotoxicity and human toxicity data and b) evidence of widespread environmental contamination (monitoring) or c) information indicating widespread environmental contamination (high production and use volumes, wide spread use etc.).

33 substances or group of substances are on the list of priority substances including selected existing chemicals, plant protection products, biocides, metals and other groups. **Priority substances** or group of substances are substances which have been shown to be of major concern for European Waters presenting a significant risk to or via the aquatic environment. **Priority hazardous substances** are substances which are of particular concern for the inland, transitional, coastal and territorial waters. These substances will be subject to cessation or phasing out of discharges, emissions and losses within an appropriate timetable that shall not exceed 20 years. List of priority substances as well as priority hazardous substances is easy to find in Annex II of EC directive 2008/105/EC.

8 substances are on the list of other **pollutants**. These eight pollutants, which fall under the scope of Directive 86/280/EEC[1] and which are included in List I of the Annex to Directive 76/464/EEC[2], are not in the priority substances list.

The WFD prioritises substances posing risks to and via the environment, hence environmental and human health hazards are considered. There are no separate criteria and cut-off values for determining priority (hazardous) substances. The Commission is to propose substances based on conclusions of EU risk assessments, results of the COMMPS procedure and priorities set in other frameworks. Decisions are taken by the Member States.

Obligations of Member States regard hazardous substances

- Planning
  - Elaborate operational objectives for "good status" for the surface waters and ground waters in the river basin based. Good status has to be based on ecological, physico-chemical and hydromorphological criteria.
  - Identify waters used for the abstraction of drinking water and establish environmental quality standards for these waters; identify other protected areas (e.g. those under EU nature protection legislation).
  - Based on an analysis of impact of human activity on the waters within the river basin, based on the monitoring of waters as well as based on the operational objectives of "good status", establish a River Basin Management Plan for each River Basin District, including programs of measures for achieving the specified objectives.

- Monitoring
  - For each River Basin District, undertake:
    - an analysis of its characteristics;
    - a review of the impact of human activity on the status of waters; and
    - an economic analysis of water use.
  - Establish programs for monitoring the status of:
    - surface waters and groundwater; and
    - protected areas.

- Regulation
  - Implement program of measures included in River Basin Management Plans.
  - Take action to prevent or reduce the impact of accidental pollution incidents.
  - Establish controls over abstraction of fresh surface water and groundwater, as well as discharges and other activities with significant adverse impacts on status of waters.
  - Establish an effective system of penalties for non-compliance with national provisions adopted pursuant to the Directive.
  - Ensure that the price charged for services related to water (e.g. drinking water supply, waste water disposal and treatment) reflects the true economic costs of providing the service.
  - Prohibit the direct discharge of a list of dangerous substances into groundwater.

- Publicity and reporting

[1] Council Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances
[2] Council Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. The Dangerous Substances Directive (DSD) 76/464/EEC and daughter directives (86/280/EEC, 88/347/EEC and 90/415/EEC) will be repealed by the Water Framework Directive (WFD) from December 2013.

- Consult interested parties on additional interim measures to combat pollution of waters.
- Report to the Commission on:
    - competent authorities;
    - exemptions from the provisions on cost recovery;
    - plans and programs;
    - penalties under national law;
    - measures taken to comply with the Directive; and
    - transposition, with texts of the main provisions of national law adopted in the field covered by the Directive.

Time frame

It is foreseen in directive that in year 2015 all natural water objects should attain good ecological quality. In year 2009 should be developed water management plans for water objects with medium, bad and very bad ecological quality (action plans for quality improving).

3.2. EU MARINE STRATEGY

The **main goal** under EU Marine strategy regarding to hazardous substances is to prevent and reduce inputs in the marine environment, with a view to phasing out pollution, so as to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea.

A new Marine Framework Directive would establish general objectives applicable to all the European waters under the jurisdiction of EU Member States with a view to achieving good environmental status of Europe's seas and oceans.

For the waters under jurisdiction of Member States within each Ecosystem-based Marine Region, programmes of monitoring and assessment to review the status of marine ecosystems and progress towards achieving good environmental status should be established. A main feature of these programmes should be that they integrate obligations for monitoring and assessment contained in other relevant legislation as well as those deriving from international agreements to which the Community is a party.

The goal of the Marine Strategy Framework Directive is in line with the objectives of the Water Framework Directive which requires surface freshwater and ground water bodies - such as lakes, streams, rivers, estuaries, and coastal waters - to be ecologically sound by 2015 and that the first review of the River Basin Management Plans should take place in 2020.

Hazardous substances

No defined substances are mentioned under Marine Strategy but in the scope of Strategy are priority substances under WFD which are relevant for the marine environment such as pesticides, antifoulants, pharmaceuticals, resulting, for example, from losses from diffuse sources, pollution by ships, atmospheric deposition and biologically active substances), as well as non-synthetic substances and compounds (e.g. heavy metals, hydrocarbons, resulting, for example, from pollution by ships and oil, gas and mineral exploration and exploitation, atmospheric deposition, riverine inputs) and radio-nuclides, inputs of fertilisers and other nitrogen — and phosphorus-rich substances (e.g. from point and diffuse sources, including agriculture, aquaculture, atmospheric deposition), and inputs of organic matter.

Time frame

- 5 years after entry into force of a new Marine Framework Directive – development of Implementation Plans. Implementation Plans would be reviewed if and when necessary and in case every five years thereafter.
- 6 years after entry into force of a new Marine Framework Directive – Monitoring and assessment programmes operational.
- 15 to 20 years after entry after entry into force of a new Marine Framework Directive – achievement of good environmental status of Europe's seas and oceans.

The Marine Strategy Directive requires European Union Member States to develop science-based marine strategies with the involvement of stakeholders, in order that Europe's marine environment reaches 'good environmental status' by 2021.

3.3. CLASSIFICATION OF SUBSTANCES

Chemicals legislation requires that all chemicals (substances and preparations) on the market have to be classified, i.e. assessed whether or not they are dangerous by applying a harmonised set of criteria. If the chemical is classified as dangerous, it has to be labelled and handled accordingly. Users of such chemicals are obliged to take the classification into account and to handle chemicals safely.

The term "hazardous" in relation to chemical substances is legally defined in the EU by the GHS-implementing regulation - **Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures.**

This new Regulation on classification, labelling and packaging ("CLP Regulation") contributes to the GHS aim that the same hazards will be described and labelled in the same way all around the world. By using internationally agreed classification criteria and labelling elements, it is expected to facilitate trade and to contribute towards global efforts to protect humans and the environment from hazardous effects of chemicals.

The purpose of this Regulation is to ensure a high level of protection of human health and the environment as well as the free movement of substances, mixtures and articles by:

- harmonising the criteria for classification of substances and mixtures, and the rules on labelling and packaging for hazardous substances and mixtures;
- providing an obligation for:
    - manufacturers, importers and downstream users to classify substances and mixtures placed on the market;
    - suppliers to label and package substances and mixtures placed on the market.

The aim of the Regulation is to enable a judgment on a substance or mixture (preparation) with respect to its hazardous properties and to provide a hazardous chemical with pertinent hazard labelling and information on safety measures. The act

- Applies the general principles of the UN GHS;
- Keeps the scope as close as possible to the old EU system (Directives 67/548/EEC and 1999/45/EC);
- Stays as close as possible to the UN GHS format and terminology, e.g. "mixture" instead of "preparation", or "hazardous" instead of "dangerous";
- But maintains the concept of "dangerous", to avoid changing the scope of REACH and other Community legislation,

As with the old legislation, the new CLP Regulation is intended to be primarily a self-classification system for enterprises. It enters into force on 20 January 2009 and stipulates that the deadline for substance reclassification is 30 November 2010 and for mixtures 31 May 2015. The old Directives on classification, labelling and packaging, i.e. Council Directive 67/548/EEC and Directive 1999/45/EC, will be repealed on 1 June 2015.

Hazardous substances

All substances fulfilling the criteria of at least one hazard class of the GHS are called hazardous. The hazard classes comprise physico-chemical, human health and environmental hazards. From the perspective of environmental protection, only a sub-group of substances defined as hazardous are relevant.
Dangerous substances are a subset of "hazardous substances", excluding hazard classes, which don't exist under the EU Classification and Labelling Directive (67/548/EEC)[3].

> *The GHS definition of a hazardous substance includes all hazard classes of the GHS: physico-chemical, human health and environmental hazards and contains testing methods and cut-off values for deciding whether or not the criteria of a specific hazard class are met.*

EU Classification and Labelling Directive (67/548/EEC)
The EU classification and labelling Directive defines dangerous substances. The term "hazardous" does not exist.

> *A substance is regarded as dangerous if one or more of the criteria for a dangerous property are fulfilled. "Dangerous" includes physic-chemical, human health and environmental dangers. The term hazardous does not exist.*

3.4. REACH REGULATION

Registration, evaluation and authorisation of chemicals (REACH) are procedures, which have been elaborated with the aim to ensure a high level of protection of human health and the environment, including the promotion of alternative methods for assessment of hazards of substances, as well as the free circulation of substances on the internal market while enhancing competitiveness and innovation. The processes are established by the Regulation (EC) No 1907/2006 of the European Parliament and Council of 18th December 2006, concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

REACH means:

- **R**egistration: registration is a basic condition for manufacture or import of substances. It is an administrative process under which manufacturers and importers of chemicals will gather relevant information on their substances and apply for registration to the European Chemicals Agency.
- **E**valuation: Evaluation procedure under REACH Regulation can be targeted to dossier or substance. Dossier evaluation is performed by Agency and consists of two parts: examining any testing proposal set out in a registration to avoid unnecessary testing; and verifying that the information in the technical dossier is in compliance with the requirements. Substance may undergo evaluation, if there is a concern over potential risks of substance to human health or the environment. The

[3] The term dangerous has been defined in the GHS implementing regulation in order to limit the consequences of reclassification or additional classifications under downstream legislation, which makes reference to substances classified as dangerous.

evaluation will be carried out by Member States Competent Authorities. If Competent Authority considers that further information is required, registrant shall submit the information required to the Agency by the deadline set.

- **A**uthorisation of **Ch**emicals: Use of substances with properties of very high concern will be made subject to Authorisation; manufacturers and importers of such substances will need to apply for a special permission (Authorisation) and demonstrate that risks associated with the use of these substances are adequately controlled or that the socio-economic benefits of their use outweigh the risks and there are no suitable alternative substitute substances or technologies.
- Restrictions: Restriction means any condition or prohibition of the manufacture, use or placing on the market of chemical substances on their own, in preparations or in articles.

Hazardous substances

Neither the term "hazardous" nor the term "substance of very high concern" are defined in REACH. However, it is commonly understood that substances of very high concern are defined by the criteria of Article 57 of REACH. This is evident as the term is used in the guidance documents and the recitals of REACH.

Substances of very high concern are as substances meeting the following criteria:

- carcinogenic category 1 or 2 (Dir. 67/548/EEC)
- mutagenic category 1 or 2 (Dir. 67/548/EEC)
- toxic for reproduction category 1 or 2 (Dir. 67/548/EEC)
- persistent, bioaccumulative and toxic in accordance with Annex XIII of REACH
- very persistent and very bioaccumulative in accordance with Annex XIII of REACH
- substances not fulfilling the above criteria, but for which a case-by-case assessment has shown that there is scientific evidence of probable serious effects to human health or the environment giving rise to equivalent concern[4].

Substances of very high concern are identified either by the registrants based on the testing required for registration or by the competent authorities in the frame of the procedure to include substances on the Annex for authorization, involving additional testing and a case-by-case assessment of substances.

Under REACH, substances of very high concern exhibit either CMR properties (human health) or are PBTs/vPvBs (environment). Testing methods and cut-off values stem from the Classification and Labelling Directive and the REACH Annex XIII. A sub-set of SVHCs will be/is listed on a candidate list and/or Annex XIV. Substances are identified either by the registrants or by the Commission and Member States)

REACH defines PBTs/vPvBs in Annex XIII. They are normally determined based on their persistence (half-lives), tendency to bioaccumulate (bio-concentration factor) and toxicity (chronic aquatic toxicity, CM (cat 1 or 2), R (cat 1,2 or 3) or chronic human health effects (R48). For all endpoints, cut-off values are defined. A PBT/vPvB may be identified by a registrant based on testing for the registration or by the competent authorities in the frame of identifying SVHC.

Under REACH, criteria and values for identifying PBTs/vPvBs are defined. The criteria include both environmental and human health hazards. Substances may be defined as PBT/vPvB even if they don't fulfil the criteria in Annex XIII. Substances are identified either by the registrants or by the Commission and Member States).

[4] These may be substances e.g. having endocrine disrupting properties or having persistent, bioaccumulative and toxic properties or very persistent and very bioaccumulative properties, which are not determined in standard testing but by other means.

3.5. HELCOM CONVENTION

Convention on the **Protection of the Marine Environment of the Baltic Sea Area**, 1992 (entered into force on 17 January 2000)

HELCOM convention was signed in year 1992 by all the states bordering on the Baltic Sea and the European Community. After ratification the HELCOM convention entered into force on 17 January 2000. The convention covers the whole of the Baltic Sea area, including inland waters as well as the waters of the sea itself, and the sea-bed. Measures are also taken in the whole catchment area of the Baltic Sea to reduce land-based pollution. One of the priorities set under convention are preventing pollution by hazardous substances and other important - environmental monitoring and assessment.

Main obligations and principles under HELCOM convention in comparison with OSPAR convention are described in the table 2.

The HELCOM Baltic Sea Action Plan is an ambitious programme to restore the good ecological status of the Baltic marine environment by 2021. HELCOM Baltic Sea Action Plan was adopted on 15 November 2007 by the HELCOM Ministerial Meeting. The plan is based on a clear set of 'ecological objectives' defined to reflect a jointly agreed vision of 'a healthy marine environment, with diverse biological components functioning in balance, resulting in a good ecological status and supporting a wide range of sustainable human activities'.

The agreed goal of HELCOM on hazardous substances is a Baltic Sea undisturbed by hazardous substances. The goal is described by four ecological objectives:

- Concentrations of hazardous substances close to natural levels
- All fish safe to eat
- Healthy wildlife
- Radioactivity at pre-Chernobyl level.

The **contracted parties** therefore have agreed:

- To adopt HELCOM RECOMMENDATION 28E/8 concerning environmentally friendly practices for the reduction and prevention of emissions of dioxins and other hazardous substances from small-scale combustion - to develop in 2008 specific efficiency requirements and emission limit values for small scale combustion appliances.
- To develop national implementation programmes by 2010 taking into account the need for:
    - identification of sources of the selected hazardous substances or substance groups;
    - a ban or restrictions on the use of identified relevant hazardous substances or substance groups;
    - substitution of the selected hazardous substances or substance groups with less hazardous substances;
    - development of technical guidance documents for environmental permitting addressing hazardous substances;
    - capacity building for authorities and industries with regard to identification of hazardous substances and the possibilities for elimination of the use of substances as well as application of BEP and BAT;
    - raising awareness among consumers by arranging campaigns and disseminating information about environmentally friendly products;
    - relevant legislation including a proper definition of hazardous substances;

- To further identify, estimate and reduce the discharges, emissions and losses from sources within the identified potential sectors and main uses and include them into national implementation programmes/ Programmes of measures under the EU Water Framework Directive for HELCOM Contracting States that are also EU Member States.
- To screen and assess of the occurrence and effects of a subset of the selected hazardous substances in the Baltic Sea marine environment will be started in 2008. Not later than in the beginning of 2009 the screening of the occurrence and effects in the environment should be complemented with screening of the sources of selected substances in municipal and industrial wastewaters as well as landfill effluents and storm waters.
- To evaluate as soon as possible, but not later than in the beginning of 2009, the practical introduction of the whole effluent assessment (WEA) approach to monitoring of complex discharges of hazardous substances into the HELCOM framework and to establish a pilot project to test some of the presented methods by making a survey in the HELCOM countries in municipal wastewater treatment plants and some specific industrial sectors.
- By 2010 to establish and develop appropriate chemical product registers in order to have more reliable substance-specific information on uses and amounts of chemicals used.
- To use the information created through implementation of the EU chemicals legislation REACH in order to decrease pollution caused by hazardous substances to the Baltic marine environment for HELCOM Contracting States that are also EU Member States**.**
- To initiate adequate measures such as the introduction of use restrictions and substitutions in the most important sectors identified by the Contracting Parties:
    - medium-chain chlorinated paraffins (MCCPs) by 2009
    - octylphenols (OP)/Octylphenol ethoxylates (OPE) by 2009
    - perfluorooctanoic acid (PFOA) by 2009
    - decabromodiphenyl ether (decaBDE) by 2009
    - hexabromocyclododecane (HBCDD) by 2009
    - endosulfan by 2010
    - pentabromodiphenylether (pentaBDE) by 2010
    - octabromodiphenylether (octaBDE) by 2010
- To start by 2008 to work for strict restrictions on the use in the whole Baltic Sea catchment area of the Contracting States:
    - perfluorooctane sulfonate (PFOS)
    - nonylphenol/nonylphenolethoxylates (NP/NPEs)
    - Short-chain chlorinated paraffins (SCCPs)
- By 2009 the possibility of introducing restrictions for cadmium content in fertilizers.
- To apply strict restrictions on the use of mercury in products and from processes and support the work towards further limiting and where feasible totally banning mercury in products and from processes.
- To implement as soon as possible the Globally Harmonised System (GHS) on classification and labelling of chemicals and to take into account guidelines for preparing safety data sheets.
- To influence ongoing work on hazardous substances in other international forums by coherent input by HELCOM Contracting States, where possible based on a common HELCOM position:
    - to the development of EU BAT Reference Documents (BREFs) in order to enhance implementation of BAT with regard to hazardous substances with special focus on main uses or on uses having high emission factor to the environment;
    - to the updating of the EU Water Framework Directive list of priority substances and substances to be evaluated under REACH with a special focus on those substances included in Annex XIV of the EU chemicals legislation REACH for those Contracting States that are also EU Member States including by transmitting monitoring data to the European Chemical Agency;
    - on placing of plant protection and biocides products on the market, if e.g. levels of these substances in the Baltic marine environment are so high that they may cause adverse effects on marine organisms.

- To promote and support the identification of new candidate substances and their inclusion in the 2001 Stockholm Convention.
- All Contracting Parties ratify the 2001 Stockholm Convention on Persistent Organic Pollutants and the 1998 Aarhus Protocol on Persistent Organic Pollutants to the UNECE Convention on Long-Range Transboundary Air Pollution as soon as possible but not later than 2010.
- To promote the Strategic Approach on International Chemicals Management and participate in the regional implementation process as soon as possible but not later that 2010.
- Starting in 2008 to develop biological effects monitoring to facilitate a reliable ecosystem health assessment.
- To continue HELCOM's work with regard to radioactivity, including monitoring of discharges, emissions from nuclear power plants as well as their effects in the marine environment in order to reach the targets for radioactivity.

Hazardous substances

The HELCOM Convention text defines[5] substances as "harmful" if they are liable to pose hazards to human health or to cause harm to the environment/natural resources or to hinder the use of the sea, to impair its quality or to lead to a reduction of its amenity.
Harmful substances: the Contracting Parties shall, in their preventive measures, give priority to the following groups of substances which are generally recognized as harmful substances:

- Heavy metals and their compounds;
- organ halogen compounds;
- Organic compounds of phosphorus and tin;
- pesticides, such as fungicides, herbicides, insecticides, slimicides and chemicals used for the preservation of wood, timber, wood pulp, cellulose, paper, hides and textiles;
- Oils and hydrocarbons of petroleum origin;
- Other organic compounds especially harmful to the marine environment;
- Nitrogen and phosphorus compounds;
- Radioactive substances, including wastes;
- Persistent materials which may float, remain in suspension or sink;
- substances which cause serious effects on taste and/or smell of products for human consumption from the sea, or effects on taste, smell, colour, transparency or other characteristics of the water.

Furthermore, the production and use of some POPs should be banned (list of substances please look from Annex 2) and the use of pesticides (list of pesticides please look from Annex 2) minimized by the contracting parties. Apart from the qualitative definition of a harmful substance and the general criteria, no cut-off values exist in the Convention.

HELCOM defines hazardous substances based on intrinsic properties regarding environmental and human health hazards as well as considerations based on exposure and risks. There is no cut-off values defined. The selection is based on a common procedure of the Convention parties.

HELCOM Baltic Sea Action Plan defines hazardous substances or substance groups of specific concern to the Baltic Sea:
1. Dioxins (PCDD), furans (PCDF) & dioxin-like polychlorinated biphenyls
2a. Tributyltin compounds (TBT)

[5] "Harmful substance" means any substance, which, if introduced into the sea, is liable to cause pollution;"
"Pollution" means introduction by man, directly or indirectly, of substances or energy into the sea, including estuaries, which are liable to create hazards to human health, to harm living resources and marine ecosystems, to cause hindrance to legitimate uses of the sea including fishing, to impair the quality for use of sea water, and to lead to a reduction of amenities;

2b. Triphenyltin compounds (TPhT)
3a. Pentabromodiphenyl ether (pentaBDE)
3b. Octabromodiphenyl ether (octaBDE)
3c. Decabromodiphenyl ether (decaBDE)
4a. Perfluorooctane sulfonate (PFOS)
4b. Perfluorooctanoic acid (PFOA)
5. Hexabromocyclododecane (HBCDD)
6a. Nonylphenols (NP)
6b. Nonylphenol ethoxylates (NPE)
7a. Octylphenols (OP)
7b. Octylphenol ethoxylates (OPE)
8a. Short-chain chlorinated paraffins (SCCP or chloroalkanes, C10-13)
8b. Medium-chain chlorinated paraffins (MCCP or chloroalkanes, C14-17)
9. Endosulfan
10. Mercury
11. Cadmium

HELCOM defines hazardous substances based on intrinsic properties regarding environmental and human health hazards as well as considerations based on exposure and risks. There are no cut-off values defined. The selection is based on a common procedure of the Convention parties.

3.6. OSPAR CONVENTION

OSPAR convention - **The Convention for the Protection of the marine Environment of the North-East Atlantic** (The OSPAR convention now regulates European standards on marine biodiversity, eutrofication, the release of hazardous and radioactive substances into the seas, the offshore oil and gas industry and baseline monitoring of environmental conditions). The OSPAR Convention entered into force on 25 March 1998.

The OSPAR Convention aims to protect the marine environment through the monitoring and control of a wide range of human activities. In particular, it aims to prevent and eliminate pollution from land-based sources, offshore oil and gas installations and from the dumping of wastes at sea, this last practice being one which is now largely prohibited. The Convention is built on the fundamental principles of precaution and polluter pays and relies on the implementation of technologies and practices, including the development of clean technologies, in order, as far as possible, to prevent pollution at source. During the one of the first meetings were agreed about strategies to achieve continuous reductions in releases of hazardous chemicals, and progressive and substantial reductions in releases of radioactive substances, with the aim of cessation of these discharges within a generation (by 2020).

Contained within the OSPAR Convention are a series of Annexes which deal with the following specific areas:

- Annex I: Prevention and elimination of pollution from land-based sources;
- Annex II: Prevention and elimination of pollution by dumping or incineration;
- Annex III: Prevention and elimination of pollution from offshore sources; and
- Annex IV: Assessment of the quality of the marine environment.

<u>Hazardous substances</u>

OSPAR defines hazardous substances as substances which are persistent, liable to bioaccumulate and toxic (PBT substances), or which give rise to an equivalent level of concern as the PBT substances (e.g. endocrine disruption). OSPAR substances of potential concern are defined by their being PBTs or of similar concern, based on environmental and human health hazards. They are selected by the Contracting parties.
Substances under OSPAR convention includes:

- heavy metals and their compounds;
- organohalogen compounds (and substances which may form such compounds in the marine environment);
- organic compounds of phosphorus and silicon;
- biocides such as pesticides, fungicides, herbicides, insecticides, slimicides and chemicals used, *inter alia*, for the preservation of wood, timber, wood pulp, cellulose, paper, hides and textiles;
- oils and hydrocarbons of petroleum origin;
- nitrogen and phosphorus compounds;
- radioactive substances, including wastes;
- persistent synthetic materials which may float, remain in suspension or sink.

OSPAR substances of potential concern are defined by their being PBTs or of similar concern, based on environmental and human health hazards. They are selected by the Contracting parties.

Table 2: Main obligations for contracting parties under HELCOM and OSPAR convention

HELCOM convention	**OSPAR convention**
Contracting Parties undertake to prevent and eliminate pollution of the marine environment of the Baltic Sea Area caused by harmful substances from all sources, according to the provisions of this Convention and, to this end, to implement the procedures and measures of Annex I of the convention (list of substances which should be banned, limited use, substance identification).	Contracting parties shall take all possible steps to prevent and eliminate pollution and shall take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected.
In order to restore the ecosystem of the Baltic Sea area and preserve its ecological balance the Contracting Parties shall individually or jointly take all *appropriate legislative, administrative or other measures* to prevent and eliminate pollution.	Contracting Parties shall, individually and jointly, *adopt programmes and measures* and shall harmonise their policies and strategies.
Preventive measures must be taken whenever there are reasonable grounds to believe that substances or energy directly or indirectly introduced into the marine environment might harm human health, living resources or marine ecosystems, or damage amenities or interfere with other legitimate uses of the sea.	Contracting Parties shall apply *the precautionary principle*, by virtue of which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects.
Best Environmental Practices (BEP) and *Best Available Technologies* (BAT) will be promoted by the Contracting Parties to prevent the pollution of	In implementing the Convention, Contracting Parties shall *adopt programs and measures* which contain, where appropriate, time-limits for their completion

the Baltic Sea.	and which take full account of the use of the latest *technological developments and practices* designed to prevent and eliminate pollution fully. To this end they shall: • taking into account the criteria set forth in Appendix 1 (on the prevention and elimination of pollution from land-based sources), define with respect to programs and measures the application of, *inter alia*: best available techniques, best environmental practice including, where appropriate, clean technology; • in carrying out such programs and measures, ensure the application of best available techniques and best environmental practice as so defined, including, where appropriate, clean technology.
Additional measures shall be taken if the consequent reductions of inputs do not lead to acceptable results. The "*polluter pays*" *principle* should serve as the economic basis for the control of environmentally harmful activities, emphasizing the importance of responsibility by forcing polluters to pay for the true costs of their activities.	Contracting Parties shall apply *the polluter pays principle*, by virtue of which the costs of pollution prevention, control and reduction measures are to be borne by the polluter.
Monitoring: Emissions from both point sources and diffuse sources into water and the air should be measured and calculated in a scientifically appropriate manner by the Contracting Parties.	
Avoiding risks: Implementing the Helsinki convention should neither result in transboundary pollution affecting regions outside the Baltic Sea area, nor involve increases or changes in waste disposal or other activities that could increase health risks. Any measures taken must not lead to unacceptable environmental strains on the atmosphere, soils, water bodies or groundwater. If the input from a watercourse, flowing through the territories of two or more Contracting Parties or forming a boundary between them, is liable to cause pollution of the marine environment of the Baltic Sea Area, the Contracting Parties concerned shall jointly and, if possible, in co-operation with a third state interested or concerned, take appropriate measures in order to prevent and eliminate such pollution.	The Contracting Parties shall apply the measures they adopt in such a way as to prevent an increase in pollution of the sea outside the maritime area or in other parts of the environment.

3.7. STOCKHOLM CONVENTION

Stockholm Convention (**The Stockholm Convention on Persistent Organic Pollutants**) is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife. Stockholm Convention, which was adopted in 2001 and entered into force 2004, requires Parties to take measures to eliminate or reduce the release of POPs into the environment.

Hazardous substances

The Convention aims to protect human health and the environment from the effects of persistent organic pollutants (POPs) with a range of control measures to reduce and, where feasible, eliminate POPs releases, including emissions of unintentionally produced POPs such as dioxins. The Convention also aims to ensure the sound management of stockpiles and wastes that contain POPs. The Stockholm Convention focuses on eliminating or reducing releases of 12 POPs, the so-called "Dirty Dozen". 12 POPs are listed in the Annex 2.

The Stockholm Convention having five essential aims:

- Eliminate dangerous POPs, starting with the 12 worst
- Support the transition to safer alternatives
- Target additional POPs for action
- Cleanup old stockpiles and equipment containing POPs
- Work together for a POPs-free future

Obligations for ratified countries

The convention entered into force on May 17th, 2004 with ratification by an initial 128 parties and 151 signatories. Co-signatories agree to outlaw nine of the dirty dozen chemicals, limit the use of DDT to malaria control, and curtail inadvertent production of dioxins and furans. Parties to the convention have agreed to a process by which persistent toxic compounds can be reviewed and added to the convention, if they meet certain criteria for persistence and transboundary threat.

3.8. ROTTERDAM CONVENTION

The Rotterdam Convention is a multilateral agreement to promote shared responsibilities in relation to **importation of hazardous chemicals**. It became legally binding to its parties in 2004, and as of 2008, 73 countries were signatories and 126 were parties. The convention promotes open exchange of information and calls on exporters of hazardous chemicals to use proper labelling, include directions on safe handling, and inform purchasers of any known restrictions or bans. Parties can decide whether to allow or ban the importation of chemicals listed in the treaty, and exporting countries are obliged make sure that producers within their jurisdiction comply.

General Obligations on Parties

The obligations under the Convention require a number of actions. Each participating country must do the following main activities regarding hazardous substances in water:

- Member States may propose a listing of a severely hazardous pesticide for inclusion in list of substances banned or severely restricted.
- Member States shall implement appropriate legislative or administrative measures to ensure timely decisions with respect to the import of chemicals listed in Annex III (chemicals that are subject to Rotterdam convention).
- Member States shall ensure that the chemicals listed in hazardous substances are not exported from its territory to an importing state contrary to the import decision notified by the state.
- MS which has banned or severely restricted a chemical shall provide an export notification to the importing state unless the chemical is already listed on list of substances under convention.
- MS shall require that both chemicals listed in substance list under convention and chemicals banned or severely restricted in its territory are subject to labelling requirements that ensure adequate availability of information with regard to risks and/or hazards to human health or the environment.
- Member States shall exchange scientific technical, economic and legal information concerning the chemicals within the scope of this Convention including toxicology, ecotoxicology and safety information.
- Member states shall provide information to other Parties on domestic regulatory actions they have taken that substantially restricts one or more uses of chemicals. Some confidential information can be protected.
- Member states shall ensure that the public has appropriate access to information on chemical handling and accident management and on alternatives that are safer for human health or the environment.

Substances under the Rotterdam Convention please look from the Annex 2.

3.9. NATIONAL LEGAL ACTS: ESTONIA, LATVIA, LITHUANIA

Chapter describes legal acts relevant in Baltic States including short information on aim regarding hazardous substances and requirements to reduce the risk of hazardous substances. List of legal acts is given in Annex 1.

Table 3: List of legal acts regarding hazardous substances in Estonia

	Legal acts	Aim regard hazardous substance	Requirements to reduce the risk of hazardous substance
IPPC	Integrated Pollution Prevention and Control Act (adopted in October 2001, last amendment in February 2009)	Determines the environmentally hazardous activities and lays down the bases for the integrated prevention and control of pollution arising from such activities.	• The permit shall guarantee the protection of water, air and soil and the management of waste generated by an installation in a way which prevents the transfer of pollution from one medium to another (water, air and soil). • The permit shall assess relevance of used equipment and technology regarding BAT, and describe other techniques to avoid or minimise pollution • Considering the chemicals and water pollution a permit shall contain the following information: o the extent of use and storage conditions of raw materials, chemicals and purifying materials, and the measures which ensure the effective use or the recovery of such resources; o the sources of emissions from the installation; o the nature and quantities of foreseeable

			emissions from the installation into each medium as well as identification of significant effects of the emissions on the environment; o the proposed technology and other techniques for preventing or, where this not possible, reducing emissions from the installation; o where necessary, measures for the prevention and recovery of waste generated by the installation; o measures planned to monitor emissions into the environment. The maximum limits of certain substances emission will be designated in consistency of water emission.
Water	WATER ACT (adopted in May 2004, last amendment in March 2009)	Purpose is to guarantee the purity of inland and transboundary water bodies and groundwater, and ecological balance in water bodies.	• A permit for the special use of water is necessary if effluent or other water pollutants are discharged to a recipient. • Water discharge which contains hazardous substances is regulated by a permit for the special use of water which takes the results of a water study into consideration. The water study is obligatory: a) in case list I substances are discharged; b) list II substances are discharged into ground water or to the area where groundwater is unprotected. • The conditions for discharging hazardous substances from industrial installations or other enterprises using hazardous substances to the public sewerage system shall be determined in a contract between a water company and a client (hereinafter contract). • The maximum allowable amounts of emission of hazardous substances per raw material or production unit (mercury, cadmium, pentachlorophenol, hexachlorobutadiene, trichloromethane, tri- and tetrachloroethene, tri- and hexachlorobenzene, 1,2-dichloroethane, hexachlorocyclohexane) shall be established by a regulation of the Minister of the Environment (October 16 2003 No. 76).
	Lists of hazardous substances for aquatic environment (Regulation of the MoE from August 21 2001 No. 44)	Regulates substances which direct emission into the environment is prohibited and substances which discharge or disposal into water must be restricted.	• Substances whose water discharge or disposal into water in any other manner must be avoided shall be entered in list 1. Direct emission into the environment of hazardous substances entered in list 1 is prohibited. The discharge of hazardous substances directly into the groundwater or an area with unprotected groundwater is deemed to be direct emission. Any other type of emission is deemed to be indirect. • Substances whose water discharge or disposal into water in any other manner must be restricted shall be entered in list 2.
	Maximum Limits for Dangerous Substances in Soil and Groundwater (Regulation of the MoE from April 02 2004 No. 12)	The maximum limits for dangerous substances serve as the basis for assessing the condition of soil and groundwater and for planning measures necessary to improve the condition of soil and groundwater.	• The maximum limits for dangerous substances are expressed as reference values and target values for these substances. o The reference values for dangerous substances in soil are expressed in micrograms per dry mass of soil. o The reference values for dangerous substances in groundwater are expressed in micrograms per unit of volume
	Maximum Limits for Dangerous Substances	The maximum limit is the concentration of a dangerous	If the value is at or below maximum limit the chemical condition of the surface water or seawater is good, that is,

	in Surface water and Seawater (Regulation of the MoE from March 11 2005 No. 17)	substance in surface water or seawater above which the surface water or seawater is polluted and dangerous to human health and the environment	safe for humans and the environment.
	Public Water Supply and Sewerage Act (adopted in February 1999, last amendment in December 2008)	Regulates the organisation of supply with water and the leading off and treatment of waste water, rain water, drainage water and other soil and surface water through the public water supply and sewerage system.	• The request for the connection with public water supply and sewerage system is not satisfied if the connection party would like to lead wastewater to public sewerage system which content of hazardous substances does not correspond to the requirements. • Water undertakings are required to accept from clients the waste water in which the concentrations of pollutants do not exceed the limit values established by the rules on use of the public water supply and sewerage systems, and the waste water for which limit values for pollutants have not been established by the specified rules but which does not damage the public water supply and sewerage system and does not cause disturbances in the purification process.
	Enforcement of the requirements to discharge hazardous substances to the public sewerage system (Regulation of the MoE from October 16 2003 No.75)	Maximum limit values are established concerning hazardous substances in waste water conducted to the public sewerage system.	
	Requirements to discharge wastewater to the water body or into the soil (Regulation of the Government of the Republic from July 31 2001 No. 269)	Requirements for effluent purification, conducting to the water body or into the soil and the control measures for accomplish the requirements are established.	• Content of pH or hazardous substances in effluent which is conducted to the water body may not pass the maximum limit values in annex 1. • Pollution indicators in effluent which is conducted to the water body must correspond to maximum limit values in annex 2 or to effluent purity degree. • Content of pH or hazardous substances in effluent which is conducted into the soil may not pass the maximum limit values in annex 3. • It is not allowed to conduct effluent into the soil which consist certain hazardous substances more than the limit of detection.
Chemicals	CHEMICAL ACT (adopted in May 1998, last amendment in January 2009)	Provides the legal basis for organisation of the handling of chemicals, provides the principal safety requirements and the procedure of notification of chemicals.	• A substance is a chemical element and its compounds in the natural state or obtained by any production process, together with any additive necessary to preserve the stability of the product and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition. • A preparation is a mixture composed of two or more substances. • Dangerous chemicals are chemicals which due to their intrinsic properties may cause damage to health, the environment or property. Classification rules are enforced by the Regulation of Ministry of Social Affairs from December 3 2004 No. 122. • Maximum limits for dangerous substances in earth, groundwater, surface water, seawater, sediments and organisms shall be established by a regulation of the Minister of the Environment (see Regulations 12 and 17 in section "Water", for sediment and organisms not adopted yet).

			• The handler of a chemical shall have the necessary information concerning the physico – chemical properties, hazards, safety requirements and rendering harmless of such chemical. • The handler of a chemical shall adhere to the safety requirements established for the handling of the chemical. • The packaging of a chemical shall be durable, be labelled as required to ensure the safe handling of the chemical and resistance to avoid a chemical leaking. • Safety data sheet is submitted according to requirements of REACH Regulation article 31. • The person responsible for the placing on the market of a hazardous chemical shall submit to the Chemicals Notification Centre a safety data sheet concerning a preparation dangerous to health prepared on paper or in a format which can be reproduced in writing within at least thirty days after the initial placing on the market of the chemical. • EINECS substances which are produced or imported at least 10 tonnes per year, are reported to the Chemicals Notification Centre by June 07
	Requirements on accounting dangerous chemicals (Regulation of the Ministry of Social Affairs from December 17 2004 No. 131)	Requirements on keeping chemicals inventory and reporting	Inventory is kept in a way it shall immediately reveal chemicals handled in the installation. Specific references shall be made about chemicals which use is prohibited or restricted (REACH Regulation applies). Annual report for previous year shall be available from 1st of February and shall presented upon demand of inspecting authorities. 10 year data should be available.
Waste	WASTE ACT (adopted in January 2004, last amendment in May 2009)	Provides general requirements to prevent waste generation and impacts resulting from waste. Gives legal bases for waste management, including reducing hazardousness and quantities.	Specifically refers to some dangerous substances which use in "products of concern" is prohibited or limited. Specific waste management rules for wastes containing PCB or PCT (MoE Regulation from April 22 2004 No. 25), for used batteries and accumulators (MoE Regulation from January 10 2008 No. 5),for electric- and electronic devices (MoE Regulation from February 9 2005 No. 9), for persistent organic compounds (not adopted yet) Specific requirements for landfill, waste incinerators and co-incinerations (further specified by regulations of Ministry of Environment) Requirements for issuing waste permits and hazardous waste management licenses. Reporting requirements
	The list of prohibited hazardous substances in the products of concern and enforcement of prohibitions and limitations regarding the products of concern (Regulation of the Government of the Republic from July 6 2006 No. 154)	Establishes: • the list of the prohibited hazardous substances in the products of concern; • maximum limits of hazardous substances in certain products of concern.	Regulates products containing following substances and their compounds: hexavalent chromium, lead, mercury, cadmium, polybrominated diphenylether, polybrominated diphenyls.

Table 4: List of legal acts regarding hazardous substances in Latvia

	Legal acts	Aim regard hazardous substance	Requirements to reduce the risk of hazardous substance

IPPC	Cabinet of Ministers Regulation No 294 adopted on July 9, 2002 Procedures by which Polluting Activities of Category A, B and C shall be Declared and Permits for the Performance of Category A and B Polluting Activities shall be Issued	Aim is to regulate (minimize) polluting activities using permitting system for industrial or other companies in compliance with environmental protection requirements. Aim of Regulation No.294 is to set the order of application, conditions for receiving A, B, C category permit and in this way regulate emission limits for use of hazardous substances for particular companies, as well as allow or ban to use substances, set conditions to use best available techniques (obligatory for A category, voluntary for B category), for B category companies stimulate to use equipment that is „more friendly for environment", terms for use polluting activities, make use of substances, pollution activities for public more „transparent".	In regulation are set conditions that industries should use appropriate technique or equipment that is in accordance with environmental requirements (BAT obligatory for A category) that is most effective and pollution are controlled as well as determined conditions which companies should follow in using hazardous substances, and guidelines for authorities in evaluation process issuing the permits, for example, restrict use of certain substances or restrict emissions of certain substances considering certain circumstances when pollution can cause threats for human health and environment.
Water	Cabinet Regulation No. 858 Regulations on typology of surface water bodies, classification, quality elements and procedures for identification of anthropogenic loads 19.10.2004	One of the important objectives is emission restriction from priority substances by determining economical activities. Regulation applies on inland surface waters, determining criteria of good, average, bad and very bad water ecological quality and criteria of good and bad chemical status quality in water.	Summarize and analyze information about important anthropogenic loads and determine those economic activities related with industrial, agricultural, municipal services and other areas where can rise pollution from point or diffusion sources and where priority substances can get into water environment
	Cabinet Regulation No. 34 Regulations regarding Discharge of Polluting Substances into Water (22.01.2002)	• Restrict emissions from hazardous substances into all kind of waters by setting limit values and control mechanisms (monitoring system). • Regulation prescribes limit values for waste water discharge and prohibitions for discharge of polluting substances into water; • As well as regulation prescribes procedures by which an operator shall control the quantity of discharge of polluting substances, perform monitoring and provide the relevant information. This regulation applies to all water – inland waters, coastal waters, transitional waters, ground waters, waste waters, domestic waste waters, run-off rain water, industrial waste water, urban waste water. Emission limits for hazardous substances what are used in industrial processes are set in A and B category permits (individual for companies).	Regional environmental boards sets a conditions for industries that pollution from hazardous substances should not increase as well as sets requirements for monitoring.
	Water Management Law (12.09.2002)	• to prevent deterioration of the status of all surface water bodies and to protect thereof by improving the water quality and, where necessary, by performing depollution – in order to achieve a good surface water status in all surface water bodies; • to protect and improve water quality in	• There are determined in the Law that the Cabinet shall set the minimum requirements, conditions and prohibitions which shall be included in the program of measures, as well as activities which must be performed if the environmental quality objectives specified in this Law have not been achieved in the relevant water body.

		all heavily modified water bodies and artificial water bodies in order to achieve good ecological potential and the chemical quality of surface waters; • to progressively reduce pollution caused by priority substances and to cease or prevent progressively the emission and discharge of substances, which are particularly hazardous to the aquatic environment. • to prevent or limit the conduct of polluting substances into the groundwater and to prevent deterioration of all groundwater bodies; • to stop the increase in the concentration of a polluting substance caused by human activity in groundwater or to achieve progressive reduction thereof; • Environmental quality objectives shall be achieved by implementing the management plans and programs specified in Water Management Law. When determining measures for achieving environmental quality objectives the status of the particular water body and the status of waters in other water objects located in one river basin shall be taken into account. • The Law specifies a complex approach for the emission limitation from point and diffusion sources of pollution in compliance with the requirements of prevention and control of the pollution specified in the Law on Pollution, limiting the loads of diffusion pollution and, where necessary, facilitating the use of the best available techniques and environmental abatement technologies.	• Mandatory measures and, if necessary, also supplementary measures, which must be taken in the particular district in order to achieve the environmental quality objectives set, shall be specified in each programs of measures. The programs of measures shall also indicate the measures, which apply to the entire territory of the State.
	Cabinet Regulation No. 118 adopted on March 12, 2002. Regulations regarding the Quality of Surface Waters and Groundwaters, with amendments until 04.10.2005	Set quality standards for surface and underground waters prescribing limit values for particularly dangerous and dangerous substances for emission into the water (applies on all waters – priority fish waters, drinking water, etc.)	• Industry should make monitoring for particularly dangerous and dangerous substances if in the result of its industrial process these substances are emitted in surface or underground water • If monitoring results shows that limit values are exceeded somewhere or environmental quality objectives won't be reached then Ministry of Environment instruct some of state environmental boards following: investigate reasons of non-compliances; revise conditions of A or B category permits reducing emission limits for substances, revise monitoring programs, implement other measures which would reduce further deterioration of water quality and promote improvement of it. • Determines special purpose values and limit values for substances in water which will be used for drinking water
Chemi cals	Law on Chemical Substances and	The purpose of this Law is to prevent, impede or reduce the possibility of harm, which may	• Law on chemical substances and chemical products determines competent institutions

	Chemical Products (01.04.1998) with amendments until 30.06.2005.	be caused to the environment, human health and property by chemical substances and chemical products due to the properties inherent thereto.	in this field, sets the roles for competent institutions, define rights for controlling institutions. Here are determined that industries should avoid from hazardous substances if there are similar substances what could be less harmful for environment. • Here are included such important conditions that concerns on knowledge about substances used, proper education and qualification of user of substances as well as foreseen possible risks of accidents, etc. • A performer of activities, taking into account the dangerous nature, quantity and circumstances of use and storage of chemical substances or chemical products must comply with the requirements of laws and other regulatory enactments, as well as take care and precautions and he or she must take the necessary measures in order to prevent harm to the environment, human life, health and property. • A performer of activities, if commercial activities are carried out, must be evaluated the possibility of accidents and made provision for the measures, which would prevent accidents or reduce the consequences thereof. • Cabinet of Ministers defines special restrictions or prohibitions for use of some chemical substances or products or other materials which contains hazardous substances.

Table 5: List of legal acts regarding hazardous substances in Lithuania

	Legal acts	**Aim regard hazardous substance**	**Requirements to reduce the risk of hazardous substance**
IPPC	1. Regulation of IPPC permit (approved by the Order of the Minister of Environment No. D1-330 of 29 June 2005 (valid from August 26, 2005).	Implementation of measures on reasoned water use and pollution reduce. Control for reducing negative impact of stationary economical activity on pollutants and their transmission form one matrix to another.	For submitting an application for IPPC permit industrial companies should prepare: • reduction program of measures, where information should include: o list and amount of hazardous and priority hazardous substances which are used during activity; o mass balance of hazardous and priority hazardous substances which are used during activity o control measures for the discharged HS; o reduction measures, where should be foreseen gradually reduction of HS or change by other alternative substances. o planned discharging amounts, sources and other characteristics of pollutants; • present and planned measures of pollution prevention. • activity's impact on environment prognosis • time table, plans and programs on monitoring of property's entity.

			IPPC permits are submitted by Regional Environmental Protection Departments, reports to European Commission on IPPC implementation by directive 96/61/EC are submitted by Environmental Protection Agency.
Water	2. Wastewater treatment regulation (approved by the Order of the Minister of Environment No. D1-236 on May 17, 2006 (valid from May 26, 2006). Some changes are done: No. D1-515 on October 8, 2007 (valid from October 26, 2007 – new wording)).	To protect environment from pollutants. The main environmental protection requirements for sewage collection, cleaning and discharging.	In the Annex I of this regulation there are listed priority hazardous substances with maximum allowable concentrations (MAC). Related to this list there is requirement for wastewater not to exceed MAC. In the Annex II of this regulation, A part lists the substances, which are proposed to be as priority hazardous substances by EC (in Lithuanian legislation they are called "hazardous substances") by Water Framework Directive 2000/60/EC and considering EC provisions on recommendation 2006/283/EC. In the regulation it is required that discharging of these substances should be reduced and gradually phased out (until 31 December, 2010). Part B (B1 and B2 parts) lists other substances, which are controlled in Lithuania. It is forbidden to exceed the limits of MAC, given in the tables of Annex I and Annex II.
	3. Rules of reduction of water pollution by priority hazardous substances (approved by the Order of the Minister of Environment No. 623 of 21 December 2001 (valid from February 9, 2002). Some changes are done: No. 267 on 22 May, 2002 (valid from June 22, 2002)	The aim of these rules is to reduce and gradually phase out the emission with wastewater of substances listed in Annex I of the rules	In this rules there are the same list of MAC of priority hazardous substances, which is in the wastewater treatment regulation. Forbidden to discharge priority hazardous substances within the wastewater without permission (IPPC requirements). Obligatory to keep the MAC given in the rules. Where is possible should be applied BAT. Forbidden to discharge priority HS to groundwater.
	4. Programme of reduction of water pollution with dangerous substances (approved by the Minister of Environment by Order No. D1-71 on February 13, 2004 (valid from March 28, 2004). Some changes are done: No. D1-259 on May 22, 2008 (valid from May 23, 2008).	To coordinate all measurements which were pointed to reduce hazardous substances in the waters. To determine measurements and institutions for reducing hazardous substances, also for assessment of water quality. The main task of the programme is – to identify measurements for reducing discharge of priority hazardous substances.	The program of reduction includes plan of the measurements with the aim: to revise the list of priority HS substances (placed in Annex II of wastewater treatment regulation (No.2 in the list of legal requirements)), identify discharging of priority HS substances, implement minimal requirements for discharging priority HS, to reach environmental quality standards according priority HS list, to control discharges of priority HS, assess the concentrations of priority HS, to submit a report to EC.

3.10. NEW LEGAL ACTS UPCOMING IN EU

New legal acts which are still under preparations were found in "Access to European Union law" web-page: http://eur-lex.europa.eu/en/index.htm

There were found 4 proposals for new legal acts concerning chemical substances in the water. All these proposals are forwarded to the Council for reweaving and/or signing.

European Parliament has approved new Directive (2008/105/EC) on environmental quality standards in the field of water policy. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 13 July 2010. In the table 6 there are listed new documents regarding hazardous substances.

Table 6: New documents regarding hazardous substances in EU

	Name of act	**Aim regards hazardous substances**
1.	Directive **2008/105/EC** of the European Parliament and of the Council of **16 December 2008** on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council	This Directive lays down environmental quality standards (EQS) for priority substances and certain other pollutants as provided for in Article 16 of Directive 2000/60/EC, with the aim of achieving good water quality status. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 13 July 2010. **Requirements for MS**: 1. In accordance with this directive, MS shall apply EQS laid down in Part A of Annex I to this Directive for surface water bodies. 2. MS shall arrange for the long term trend analysis of concentrations of those priority substances listed in Part A of Annex I that tend to accumulate in sediments and/or biota on the basis of monitoring of water status. They shall take measures aimed and ensuring that such concentrations do not significantly increase in sediment and/or biota. 3. MS shall determine the frequency of monitoring in sediment and/or biota so as to provide sufficient data for a reliable long-term trend analysis. 4. MS may designate mixing zones adjacent to points of discharge. Concentrations of listed in Part A of Annex I may exceed the relevant EQS. 5. MS shall establish an inventory, including maps, if available, of emissions, discharges and losses of all priority substances and pollutants listed in Part A of annex I to this Directive for each river basin district including their concentrations. 6. The reference period for the estimation of pollutant values to be entered in the inventories referred to in paragraph 1 shall be 1 year between 2008 and 2010.
2.	No. /* COM/2005/0505 final - COD 2005/0211 */ Proposal for a Directive of the European Parliament and of the Council establishing a Framework for Community Action in the field of Marine Environmental Policy (Marine strategy Directive)[SEC(2005)1290] Date of document transmission is 24/10/2005	This Directive establishes a framework for the development of Marine Strategies designed to achieve good environmental status in the marine environment [by the year 2021 at the latest], and to ensure the continued protection and preservation of that environment and the prevention of deterioration. For the purposes of this Directive, “environmental status” means the overall state of the environment in marine waters, taking into account the structure, function and processes of the constituent marine ecosystems together with natural physiographic, geographic and climatic factors, as well as physical and chemical conditions including those resulting from human activities in the area concerned. **Requirements for MS**: 1. MS shall take due account of the fact that their European marine waters form an integral part of the following Marine Regions: (a) the Baltic Sea; (b) the North East Atlantic Ocean; (c) the Mediterranean Sea. 2. MS shall develop a Marine Strategy for its European marine waters. 3. MS with marine waters within the same Marine Region or Sub-Region shall co-ordinate their actions. 4. MS shall designate for each Marine Region concerned the competent authority. 5. By reference to the initial assessment MS shall determine for the European marine waters a set of characteristics for good environmental status. 6. On the basis of the initial assessment MS shall establish a comprehensive set of environmental targets and associated indicators for all of their European marine waters. 7. MS shall establish and implement co-ordinated monitoring programmes for

		the ongoing assessment of the environmental status of their European marine waters. 8. MS shall identify the measures which need to be taken in order to achieve good environmental status. 9. MS shall ensure that their Marine Strategies are kept up-to-date. 10. Member States shall, within three years of the publication of each programme submit to the Commission an interim report.
3.	No. /*COM/2006/0242final*/ Proposal for a Council Regulation amending Annex IV to Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants and amending Directive 79/117/EEC. Date of document transmission is 31/05/2006	Annex IV to Regulation (EC) No 850/2004 is replaced by the following: ANNEX IV "List of substances subject to waste management provisions". In this Annex there are set concentration limits of certain priority substances as pesticides: Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene, Polychlorinated Biphenyls (PCB), DDT (1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane), Chlordecone and other pollutants, belonging to the list of Annex X of WFD.
4.	No. /*COM/2006/0252final*/ Proposal for a Council Regulation amending Annex V to Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants and amending Directive 79/117/EEC. Date of document transmission is 31/05/2006	The table in Part 2 of Annex V to Regulation (EC) No 850/2004 is replaced by the new table, where Maximum concentration limits of substances for Wastes From thermal Processes are set. Mostly of substances are above mentioned pesticides and belongs to the list of Annex X of WFD.
5.	No. /* COM/2006/0373 final - COD 2006/0132*/ Proposal for a Directive of the European Parliament and of the Council establishing a framework for Community action to achieve a sustainable use of pesticides {COM(2006) 372 final} {SEC(2006) 894} {SEC(2006) 914} Date of document transmission is 14/07/2006.	This Directive establishes a framework for achieving a more sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment in a way that is consistent with the necessary crop protection. **Requirements for MS**: 1. MS shall adopt national action plans to set up targets, measures and timetables to reduce risks, including hazards, and dependence on pesticides. 2. MS shall ensure that all professional users, distributors and advisers have access to appropriate training. 3. MS shall ensure that distributors selling pesticides classified as toxic or very toxic pursuant to Directive 1999/45/EC of the European Parliament have at least one person in their employment, who has a certificate referred to in Article 5(2), and who shall be present and available at the place of sales to provide information to customers as regards pesticide use. 4. MS shall promote and facilitate awareness programmes and availability of information relating to pesticides for the general public, in particular regarding their health and environmental effects and non-chemical alternatives. 5. MS shall ensure that pesticide application equipment and accessories in professional use shall be subject to inspections at regular intervals. 6. Member States shall ensure that, when pesticides are used in the vicinity of water bodies, preference is given to: o products that are not dangerous for the aquatic environment o most efficient application techniques, including the use of low-drift application equipment. 7. MS shall, taking due account of the necessary hygiene and public safety requirements, ensure that the following measures are adopted: o the use of pesticides shall be prohibited or restricted to the minimum necessary in areas used by the general public or by sensitive population, at least in parks, public gardens, sports grounds, school grounds and playgrounds o the use of pesticides shall be prohibited or restricted in special conservation areas or other areas identified for the purposes of establishing the necessary conservation measures in accordance with Articles 3 and 4 of Directive 79/409/EEC and Articles 6, 10, and 12 of Directive 92/43/EEC. 8. Member States shall adopt the necessary measures to ensure that the following operations do not endanger the health or safety of humans and the

		environment: o storage, handling, dilution and mixing of pesticides before application o handling of packaging and remnants of pesticides o treatment of mixtures remaining after application o cleaning of the equipment used for application. 9. MS shall take all necessary measures to promote low pesticide-input farming, including integrated pest management, and to ensure that professional users of pesticides shift towards a more environmentally-friendly use of all available crop protection measures, giving priority to low-risk alternatives wherever possible, and otherwise to the products with minimum impact on human health and the environment among the ones available for the same pest problem. 10. MS shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by [date of entry into force + 2 years] at the latest.

4. OCCURRENCE OF THE TARGET SUBSTANCES IN BALTIC STATES

This chapter gives overview of hazardous substances occurrence in raw materials (main usage of relevant hazardous substances in processes or products) and their potential occurrence in effluents (how these substances could be released to water environment).

Further on chapter describes findings from different projects and monitoring programmes on hazardous substances in Baltic States.

4.1. SOURCES OF HAZARDOUS SUBSTANCES IN GENERAL

The table 7 presents an overview on the potential sources of hazardous substances, i.e. industry branches, processes and products, and also including information which legal EU act (WFD, HELCOM or Stockholm Convention) calls it as priority hazardous substance[6].

This information could be used for further evaluation of the primary sources of hazardous substances occurred in the wastewater/sludge and the receiving environment.

Table 7: Overview on the potential sources of hazardous substances

Substances	Source/process	Included in priority list of WFD, HELCOM or Stockholm Convention
Metal industry		
Short and medium chain chlorinated paraphins	High pressure additive in metal processing fluids (both water and oil based) Cutting, drilling	WFD, HELCOM
Nonil- and octilphenoletoxilates	High pressure additive in metal processing fluids Cutting, drilling	
Tributiltin compounds	Shipbuilding and repairing – removing paint and painting. Leaching to marine environment from sea ship hulls. Antifouling paint	WFD, HELCOM
Dioxines	These chemicals are produced like certain kinds of metal recycling. Dioxins have also been found in automobile exhaust metal recycling.	
Triphenyltin compounds	Shipbuilding and repairing – removing paint and painting. Leaching to marine environment from sea ship hulls. Antifouling paint	WFD, HELCOM
Electronic industry		
PentaBDPE	Electrical equipment (electronic circuits, TVs, monitors etc.). Flame retardant	WFD, HELCOM
Nonylphenoletoxilate	Soldering agent	
Octylphenol	Production of electrical equipment Production of electric windings (e.g. in motors, transformers). Electrical insulation varnish and bonding the windings Flux agent	WFD
Polychlorinated Biphenyls (PCBs)	The compounds are employed in industry as heat exchange fluids, in electric transformers and capacitors.	HELCOM, Stockholm Convention
Textile		
Polybrominated diphenyl	Finishing (textile coating). Flame retardants	WFD, HELCOM

[6] The base of the table was taken from the report of Lithuanian screening project: http://www.bef.lt/pr_chem_projektas.php?id=1204305772 . Information on hazardous substances in raw materials was collected from "Baltic hazardous substances report, 2003".

Substances	Source/process	Included in priority list of WFD, HELCOM or Stockholm Convention
ethers (pentaBDPE, octaBDPE, decaBDPE)		
Dieldrin	The substance is used to control termites and textile pests	WFD, HELCOM, Stockholm Convention
Octylphenol/octylphenoletoxilate	Finishing (in most modern printing processes). Used in printing ink formulations as emulsifier (mainly in styrene-butadiene copolymers)	WFD
Hexabromocyclododecane (HBCDD)	Finishing. Flame retardant, back coating from polystyrene.	
Nonylphenoletoxilate	Finishing. Surfactants, conditioning agent	
SC10-13 chloralkanes	Finishing of technical textile. Flame retardant, agent for water resistance, antifungal agent	WFD, HELCOM
Tributiltin compounds	Finishing. Antifungal agent	
Plastic industry		
Polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyls (PBBs	Formulation (blending Iof polymers with various additives) and industrial use (production of finished plastic articles). Used in polyurethane foams, in thermoplastics such as ABS, polystyrene and polycarbonate: (**OctaBDPE** used in plastics in electrical installations: acrylonitrile-butadiene-styrene (ABS) polymers, also high impact polystyrene, polyamide and polybutylene terphtalate polymers, insulating wires, cables. **PentaBDPE** manufacture and different applications of flexible polyurethane foams. **DecaBDPE** used in plastic/polymer applications, insulated wires and cables, different electrical equipment.) Flame retardants.	WFD *(only PentaBDPE)*
Tetrabromobisphenol A (TBBPA) and its derivatives	Production of thermoset plastics such as epoxies, polyurethanes and polyesters. Flame retardant.	
Nonylphenol	Production of plastic products. Adhesive, binding agent, process regulator, stabilizer, hardener for epoxy resins and plastic products for construction purpose (floor covering materials, paints, sealing compounds); soldering agent in insulated wires and cables.	WFD, HELCOM
Octylphenol, butylphenols	Adhesive	WFD *(only octylphenol)*
Organotin compounds (TBT, MBT, DBT)	PVC, polyurethane, polyester production and processing. TBT is an impurity in stabilising agents containing MBT and DBT	WFD, HELCOM
Octyltins	Production of rigid PVC potable water pipes and fittings	
Butyltins	Production of rigid PVC profiles and sidings, Venetian blinds, rain gutters, window profiles	
Phtalates (DBP, DEHP)	Softener for different polymer materials (especially PVC)	WFD, HELCOM
Short and medium chain chlorinated paraphins	Production of PVC plastics. Plasticizers and flame retardants	WFD, HELCOM
Rubber industry		
Octylphenols, butylphenols	Adhesive	WFD *(only octylphenol)*
Octylphenols	Production of rubber for tyres.	WFD
Short and medium chain chlorinated paraphins	Plasticizer, flame retardant, adhesive	WFD, HELCOM
Tanneries		
Short and medium chain chlorinated paraphins	Leather processing. Fattening and liquoring agent, impregnation agent	WFD, HELCOM
Nonylphenoletoxilate	Degreasing agents	
Octylphenoletoxilate	Leather finishing. Emulsifier in finishing agents	

Substances	Source/process	Included in priority list of WFD, HELCOM or Stockholm Convention
Chemical industry		
Nonylphenoletoxilate / Octylphenoletoxilate	Industrial and institutional cleaning agents, polishing preparations. Surfactant	
Dioxins	manufacture of certain pesticides and other chemicals	
Nonylphenol/ Nonylphenoletoxilate / Octylphenoletoxilate	Paints, varnishes and coatings production. Stabilizer, emulsifying agent, dispersant	WFD *(only nonylphenol)*, HELCOM *(only nonylphenol)*
Nonylphenol	Production of cosmetics. Moisturing, emulsifying agent	WFD, HELCOM
Nonylphenol/Octylphenol	Production of NPE/OPE, manufacture of resins, plastics and stabilisers, manufacture of phenolic oximes	WFD, HELCOM *(only nonylphenol)*
Phtalates (DBP, DEHP)	Production of paints, adhesives, sealants, cosmetics. Plasticizers, softeners	WFD, HELCOM
Chloroform	Pharmaceuticals	WFD, HELCOM
Hexabromocyclododecane (HBCD)	Production of expanded polystyrene. Flame retardant	
Short and medium chain chlorinated paraphins	Paints, varnishes and coatings production. Binder, plasticizer, flame retardant	WFD, HELCOM
Furans	These compounds are produced unintentionally in the same processes that release dioxins, and they are also found in commercial mixtures of PCBs.	
Hexachlorobenzene (HCB)	released as a by-product during the manufacture of certain chemicals and as a result of the processes that create dioxins and furans.	WFD, Stockholm convention, HELCOM
Lead and its compounds	Lead is mainly used in lead-acid batteries, pigments and as stabilizers in polymers.	WFD, HELCOM
Cadmium	Cadmium is mainly used in pigments, batteries and as stabilizers in polymers (e.g. in PVC window frames).	WFD, HELCOM
Mercury	Mercury can be found in batteries, measuring devices, lighting equipment, computer monitors	WFD, HELCOM
Pulp and paper industry		
Phenols (methylphenol, nonylphenol, butylphenol, octylphenol)	Aid agent, paper coating	WFD *(only nonylphenol and octylphenol)*, HELCOM *(only nonylphenol)*
Short chain chlorinated paraphins	Solvent	
Dioxins	Pulp and paper bleaching	
AOX	Only if chlorine is used in process	
Polychlorinated Biphenyls (PCBs)	These compounds are used as additives in paint, carbonless copy paper.	Stockholm convention, HELCOM
Agriculture		
Nonylphenoletoxilate	Pesticides	
Octylphenoletoxilate	Pesticides. Dispersing agent	
Triphenyltin compounds	Fungicide for potatoes	WFD, HELCOM
Aldrin	A pesticide applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests.	Stockholm convention, HELCOM
Chlordane	Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops.	Stockholm convention, HELCOM
Dieldrin	The substance is used to control insect-borne diseases and insects living in agricultural soils.	Stockholm convention, HELCOM

Substances	Source/process	Included in priority list of WFD, HELCOM or Stockholm Convention
Endrin	This insecticide is sprayed on the leaves of such crops as cotton and grains. It is also used to control mice, and other rodents.	Stockholm convention, HELCOM
Heptachlor	Primarily employed to kill soil insects and termites, heptachlor has also been used more widely to kill cotton insects, grasshoppers, other crop pests, and malaria-carrying mosquitoes.	Stockholm convention, HELCOM
Hexachlorobenzene (HCB)	Used to kill fungi that affect food crops.	WFD, Stockholm convention, HELCOM.
Mirex	Mirex is applied mainly to combat fire ants and other types of ants and termites.	Stockholm convention, HELCOM
Toxaphene	This insecticide, also called camphechlor, is applied to cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock.	Stockholm convention, HELCOM
Chlorpyrifos	It is used as a broad spectrum insecticide in agriculture of grain, fruit and vegetables	WFD, HELCOM
Trifluralin	Trifluralin is used as a herbicide against grasses and broadleaf weeds in different agriculture crops.	WFD, HELCOM
Food industry		
Nonylphenol/Nonylphenoletoxilate/Octyphenol/ Octylphenoletoxilate	Cleaning of equipment. High performance surfactant	WFD *(only nonylphenol and octylphenol)*, HELCOM *(only nonylphenol)*
Public institutions (hospitals, schools, administration, hotels…)		
DDT	DDT was widely used during the World War II to protect soldiers and civilians from malaria, typhus, and other diseases spread by insects. To control malaria, in several countries it continues to be used for mosquitoes control.	Stockholm convention, HELCOM
Chlorpyrifos	It is used also for veterinary and hygienic purposes.	WFD, HELCOM
Nonylphenol/Nonylphenoletoxilate/Octyphenol/ Octylphenoletoxilate	Professional cleaning. High performance surfactant	WFD *(only nonylphenol and octylphenol)*, HELCOM *(only nonylphenol)*
Aviation		
Tributiltin compounds	Marking agent	WFD, HELCOM
Nonylphenoletoxilate	De-icing activities in airport. De-icing agent	
Furniture industry		
PentaBDPE	Production of soft furniture. Flame retardant	WFD, HELCOM
Creosote, PAHs	Creosote is a refined fraction from distilled beech wood, coal or tar. The content of PAHs determines the associated hazard. Creosote is used as a biocide in wood preservation for outside use.	
Organotin compounds	Tributyl tin compounds are mainly used as biocides in antifouling paints or wood preservatives.	

4.2. PREVIOUS FINDINGS IN BALTIC STATES REGARD HAZARDOUS SUBSTANCES IN WATER ENVIRONMENT

HELCOM project "**Proposals for measures and actions for the reduction of pollution from hazardous substances for the Baltic Sea action Plan**"

The project has been commissioned to support the **elaboration of measures** for the reduction of emissions, losses and discharges of certain hazardous substances in the Eastern Baltic Sea Region. The project has been implemented from 1 February until 30 September 2007 by a consortium consisting of the Baltic Environmental Forum Group, a network of non-governmental, not-for-profit organizations in Latvia, Estonia, Lithuania, Russia, and Germany and the three consulting companies: Ökopol (Germany), eko-net.pl (Poland) and Hendrikson & Ko (Estonia).

The Project focused on the conditions in the new EU member states (Estonia, Latvia, Lithuania and Poland) and Russia (North West Region only). It analyses the use and emissions of 11 (groups of) hazardous substances: *four brominated flame retardants (BFR's): penta-, octa- and decabrom dephenylether; hexabromocyclododecane (HBCDD); tributyl and triphenyltin (TBT and TPhT); Endosulphane; short chain and medium chain chlorinated paraffin (SCCP and MCCP); alkylphenolethoxilates: nonylphenolethoxilates (NP/NPEOS) and octylphenolethoxilates OP/OPEOS; PFOS related substances; Mercury (Hg) and Cadmium (Cd); Dioxins-related substances*.

The main objectives of the project were: i) to propose actions suitable to substantially contribute to improving the state of the marine environment; ii) to remove substances and sources from the HELCOM work programs that are not an issue anymore and iii) to design an Action Program which contributes to a front-running role of HELCOM in implementing the EU marine strategy and related legislation.

Main activities:

1. Analysis of the legal frameworks addressing hazardous substances;
2. Tracing back and verifying the information on certain hazardous substances in HELCOM reports and EPER to the source of origin in the country; in case of significant amounts, exploring which actions/measures are planned in the country respectively for the relevant site;
3. Identification of particular relevance of certain industry sectors in the region with help of socio-economic statistics;
4. Analysis of new Member States' activities to implement action related to WFD priority substances;
5. Analysis of set-up and operational practice regarding substance and product registers in the target countries;
6. Screening of national pesticide and biocide registers to identify remaining uses of TBT, TPhT and Endosulphane;
7. Evaluation of IPPC (and other) permits and inspectorates' practice regarding identification and minimization of hazardous substances at enterprises;
8. Identification of users, formulators and distributors in the market using or supplying products potentially containing the target substances; and,
9. Evaluation to which extent the project target substances occur in the products, raw materials or emissions of selected companies.

Main results:

1. Report compiling available info on HELCOM hazardous substances occurrence in Estonia, Latvia, Lithuania and Poland. Some hazardous substances and sources identified in Latvia and Estonia through direct contacts with formulators, suppliers, users and registers. . Final report is available in the following link: http://www.bef.lt/download_file.php?id=90

2. Set of 30 actions to promote the long term process towards the HELCOM objectives 2020 developed.

4.3. PREVIOUS FINDINGS IN LATVIA REGARD HAZARDOUS SUBSTANCES IN WATER ENVIRONMENT

In Latvia there have been several investigative projects in the field of hazardous substances in water environment. There have been projects implemented by Latvian Institute of Aquatic Ecology about heavy metals study, for example, "***Heavy metal biological occurrence from river drifted material***" (2005-2007) and an older project – "***Balance of heavy metals in Baltic Sea***" also implemented by Latvian Institute of Aquatic Ecology (year 1995-1996). There is lack of public available information about analyses of other particular substances except heavy metals or substances which is not included in state monitoring substances.

4.4. PREVIOUS FINDINGS IN LITHUANIA REGARD HAZARDOUS SUBSTANCES IN WATER ENVIRONMENT

Project: **„Screening of dangerous substances in the aquatic environment of Lithuania"** (October 2005 – March 2007).

The **main objective** of the project was to investigate the occurrence of selected WFD priority substances and some other pollutants in wastewater, sewage sludge and the receiving environment (surface water and sediments) and obtain measurement data on their concentrations.
Data collection concentrated on discharges from largest urban wastewater treatment plants and selected sampling sites on transboundary rivers and in transitional waters to the Baltic Sea. All together the project covered 44 sites, where 9 hazardous substances groups were analyzed and ecotoxicity tests were performed.

Main results of the project are listed below:

- Within the project there were analyzed **102** chemical substances/groups belonging to: metals (31 sites), phenols and their ethoxylates (43 sites), polycyclic aromatic hydrocarbons (PAH) (43 sites), chloroorganic pesticides (11 sites), volatile organic compounds (VOC)(34 sites), organotin compounds (43 sites), phtalates and their ethoxylates (43 sites), brominated diphenylethers (43 sites), short chain chlorinated parafins (43 sites), pentachlorphenol (33 sites) and other substances as chlorpyrifos (3 sites), cyanides and AOX (1 site).
- In total 44 sites were screened for the selected hazardous substances: 25 WWTP, 8 sites on transboundary rivers at the border, 2 sites on the rivers before inletting into the Curonian lagoon and Klaipėda Channel, 4 sites at the transitional waters at Klaipėda Channel, 5 sites on the rivers after polluting cities.
- Ecotoxicity tests were performed for 37 sites: 25 WWTP and 12 for the surface water.
- In the frame of this project the analysis of the hazardous substances were performed in the following matrixes: wastewater, sewage sludge, receiving waters and sediments.
- There were made the main findings and recommendations:
    - As the screening results shows - the most problematic "new-generation" substances for Lithuanian aquatic environment are ***phtalates*** and ***organotin compounds***. These substances were detected both in the wastewater and sewage sludge as well as in the receiving environment, often exceeding the applied limits.

- **Nickel** and **organotin** concentrations in bottom sediments in the receiving environment very often exceeded the EQS for the bottom sediments.
- It is only partly possible to judge on water quality with regard to its contamination with ***brominated diphenylethers***. Although it was not detected in the surface water, the LOD of the method applied in the screening exercise was 10 times higher than settled EQS.
- Although in most cases the concentrations of analysed chemical substances or groups of substances were below the existing limits, the ecotoxicity tests showed many of the toxicity cases. It can be partly explained by other exceeded parameters, such as nitrites, nitrates, amonium N, total phosphorus, COD, BOD etc.
- The limits for all substances/groups of substances screened during the project are legally available for many of them the appropriate measures enforcing their control are not in place.
- Based on the results of the screening exercise, at least the permits for the WWTP discharging the hazardous or priority hazardous substances to the environment must be revised and identified substances included to the permits and appropriate monitoring must take place (either 2 or 4 times a year as required by regulation on wastewater pollution). Further on, the state control of such objects must be performed at least once a year.
- Considering the results of the screening exercise the following substances should be monitored like a "new generation" substances: DEPH, Organotin compounds, Nonylphenol/octylphenol (potentially).
- Some of the currently applied methods for the analysis of hazardous substances in the EPA laboratory are not sufficient to control the occurrence of these substances in the wastewater or surface water according currently applied AA-MAC[7]/MAC or upcoming EQS. It would be important to improve LOD at least until the level to ensure adequate control of the substances according the required limits.
- In order to ensure the quality of samples, analysis results and their further interpretation and comparability (e.g. in case of environmental monitoring, control of separate entities etc.), it is necessary to ensure the harmonised standard sampling procedures.

- Final report is available in the following link: http://aaa.am.lt/VI/index.php#a/3043

[7] Maximum allowable concentration expressed as an annual average value.

5. MONITORING OF THE HAZARDOUS SUBSTANCES IN BALTIC STATES

5.1. STATE MONITORING PROGRAMME IN ESTONIA

The Estonian National Environmental Monitoring Programme was initiated in 1994. Presently there are altogether around 1800 monitoring stations in the monitoring set of 68 sub-programmes of 11 monitoring themes, the parameters reaching 250. The main objective of monitoring priority hazardous substances in Estonian surface water bodies is to observe long-term changes of hazardous substances in them and to assess their contamination. The results will serve as the basis for planning further measures for achieving a good condition of surface water bodies. Another main objective directly related to the monitoring of priority hazardous substances, hazardous substances, and other chemical compounds in surface water bodies is development of environmentally safe technologies.

Water monitoring during 1992 – 2004

Monitoring and hazardous substances in surface waters

Rotation monitoring of hazardous substances in water bodies of the year 2002, with the length of three years, started from Northeast Estonia, which is the most polluted (oil-shale chemistry) region in Estonia.

In 2005 Estonia drafted the report on the basis of the directive 92/44/EEC about monitoring of 17 priority hazardous substances in Estonia in water (priority), bottom sediments as well as biological objects. The report indicated mean concentrations of hazardous substances, minimum and maximum concentrations as well as number of analyses performed in a year.

Monitoring of hazardous substances in coastal waters

In 2004 concentrations of hazardous substances were analysed in organisms collected from coastal waters in Estonia, the Culf of Riga and the Culf of Finland. Concentration of heavy metals (46 samples, 30 of which contained mercury) and organic pollutants (30 samples) were measured in Baltic herring.

Concentration of cadmium, mercury, lead, copper and zinc in organisms of Estonian coastal waters are comparable to average values given for the whole Baltic Sea. Concentration of organic pollutants (HCH, DDT, PCB) in muscles of Baltic herring in the Gulf of Riga is lower in some years but usually similar to the Gulf of Finland. Relatively high concentrations of DDT and PCB in Baltic herring detected in 1999-2003 have generally decreased in 2004.

Monitoring of hazardous substances in Estonian rivers

In hydrochemical monitoring programme of rivers performed in 2003 concentration of heavy metals (copper, lead, cadmium, zinc, mercury) was determined in 16 Estonian rivers mostly once a year. Concentration of heavy metals in Estonian rivers is low remaining in many cases below detection limit or close to its concentration.

Inventory programmes

The inventory programme, from the period 1999-2001, covered 90% of “water polluters” of Estonia but single sampling and analysis of single random sample does not enable to draw essential conclusions about the state of surface water.

The inventories covered the following:

- Identification of generators of potential emissions of hazardous substances.
- Assessment of pollution load – indirect emission into groundwater, emissions into water bodies and direct emissions into the public sewerage system.
- Determination of companies, to which the establishment of obligation of monitoring of hazardous substances would be necessary.

The following conclusion was made on the basis of inventory performed in Estonia in 1999-2001: there are no enterprises subjected to directive (86/280/EEC): pentachlorophenol (PCP), aldrin, dieldrin, endrin, isodrin; DDT; Trichlorobenzene (TCB); Hexachlorobenzene (HCB); there are no enterprises subjected to directive (82/176/EEC); mercury emissions – chloroalkali electrolysis industry; there are no enterprises subjected to directive (84/491/EEC); emissions of hexachlorocyclohexane (HCH).

Water monitoring after 2006

Hazardous substances in the State Environmental Monitoring Programme 2005-2010

Monitoring of the hazardous substances in inland water bodies was done in the years 2002-2006 (after that the financing was finished). In these years the places were chosen each year again by the Ministry of the Environment, University of Tartu and by the experts of Estonian Environmental Research Centre.

Monitoring programmes which have last for years are characterized in the Table 8. These are permanent monitoring places which are first of all chosen because of the possible environmental problem or fulfilling the related international cooperation arrangements (e.g. with Russia or with HELCOM). There are national surveys and periodic inventories taking place. The inventories cannot be directly taken as monitoring, rather than onetime survey.

Table 8: Hazardous and priority hazardous substances included in the State water monitoring programme for 2009

Group	Matrixes	Parameter
Heavy metals	Peipsi lake (surface water, bottom sediments, once in fish). Rivers (fish). Coastal sea (fish: Baltic herring, perch).	Cd, Cu, Hg, Pb, Zn, some points also Cr, Ni, Mn
Organic chlorinated compounds	Coastal sea (fish: Baltic herring, perch)	DDE, DDT, DDD, PCB, alfa-HCH, beta-HCH, HCB
Phenols and oil products	Peipsi lake (surface water, bottom sediments, once in fish). Rivers (fish).	

Frequency of the monitoring

From the river waters 1-6 times in the ordinary year, depending on levels and indicators, periodically 12 times as before mentioned (heavy metals generally 1 time, oil products 6 times a year; every 5-6 years according to HELCOM PLC 12 times). In Peipsi 1 time from the water and sediments from 12 monitoring points over the lake (including monitoring points on the Russian side). Once in every 3 years fishes from all coastal sea water bodies.

Water quality with regard to hazardous substances – main findings of hazardous substances

As a rule the analyses results in the water have been under the labs decision limit, it means there have not been pollution problems. Related to new EQS directive (2008/105/EC) the environmental standards have become significantly stricter and according to new norms Estonia have problems e.g. concentration of heavy metals in coastal sea fishes. It means monitoring results exceed the new standard, especially in proportion of Hg. Whilst there have not been identified environmental problem of hazardous substances on monitoring results, then in Estonia the hazardous substances have been investigated above all with inventories, to find the problematic places and take them to the survey if needed in the future.

Analysis of priority substances in wastewater

According to Common Water Supply and Sewerage system law, approved by the Regulation of the Minister of Environment No. 75, economic entities, discharging their wastewater into the sewerage systems have to determine, which hazardous substances and priority hazardous substances and at what concentrations they are present in wastewater.
Dangerous substances allowable emission limit values per production unit, approved by the Minister of Environment by Regulation No. 76, includes a list of substances, which may be discharged by certain types of industries in certain emission limits (the mass, expressed in terms of certain specific parameters, concentration and/or level of an emission, which may not be exceeded during any one or more periods of time).
According to Water law, approved by the Regulation of the Estonian Government No. 269, entities, discharging their wastewater into the surface water have to determine, which hazardous substances and priority hazardous substances and at what concentrations they are present in wastewater.

Table 9 illustrates which of priority or priority hazardous substances on EU level are covered at least for single industry branch in the lists of the above-mentioned legislation.

Table 9: Hazardous and priority hazardous substances to be considered by certain industries

No.	Substances	CAS no	Reg. No. 75 (to be controlled)	Reg. No. 76 (indicative list)	Reg. No. 269 (to be controlled)
1	Metals		Hg, Ag, Cd, Cr, Cu, Pb, Ni, Sn, Zn, An, F, As	Hg, Cd	Hg, Ag, Cd, Cr, Cu, Pb, Ni, Sn, Zn, An, F, As
2	Tetrachlormethane	56-23-5	X		X
3	Trichlormethane (chloroform)	67-66-3	X	X	X
4	Hexachlorbenzene	118-74-1	X	X	X
5	Hexachlorbutadiene	87-68-3	X	X	X
6	1,2,3-trichlorbenzene	87-61-6	X	X	X
7	1,2,4-trichlorbenzene	120-82-1	X	X	X
8	1,2,5-trichlorbenzene	108-70-3	X	X	X
9	Pentachlorphenol	87-86-5	X	X	X
10	Cyanides		X		X
11	1,2-dichlorethane	107-06-2	X	X	X
12	Tetrachlorethylene	127-18-4		X	X
13	Trichloroethylene	79-01-6	X	X	X
14	DDT and derivates DDE and DDD	50-29-3	X		X
15	Lindane	58-89-9	X		X
16	HCH	608-73-1	X	X	X
17	Drins (aldrin, dieldrin, endrin, isodrin)		X		X
18	PCB		X		X
19	PCT		X		X
20	PAH		X		X
21	AOX		X		X

Furthermore, the economic entities have to make an inventory of chemicals, applicable to their industrial sector and present this inventory in the application for IPPC permit (IPPC law). The frequency of monitoring of hazardous substances by industries is set in the IPPC permit.

Monitoring of effluent takes place according to water permit or integrated environmental permit, it is an enterprise monitoring, based on that the enterpriser pays also the pollution charge. Donor of the permit (Environmental Office) has also ordered control analyses to control the authenticity of monitoring results,

but these have mostly been concerned on nitrogen, phosphor and BOD, not so much on hazardous substances. If the enterpriser leads the wastewater to the public sewerage system, then the requirements for hazardous substances are provided in the contract between water enterpriser and a client (at what concentration is it allowed to lead the wastewater to the public sewerage system, which substances etc.)

Conclusion

The Monitoring System has changed on last 5 years: accrues new substances, monitoring tasks must be changed as a result of inventories, including changes in monitoring network according to implementation of frame directive, environmental standards have become stricter etc.
The existence of finances affects the most fulfilling of the Monitoring Programme, it means that there have been significant changes in initial plans because of the budget cuts and everything what is pre-planned is not possible accomplish in the lack of funds. For example in the condition of economical crises and because of the budget cuts in the year 2009 there will be temporally only 11 levels on the rivers on the heavy metals monitoring, also the frequency must be reduced.
More attention must be paid on raising determination capability of hazardous substances in Estonian labs to fulfil the new strict determination standards of EU.

5.2. STATE MONITORING PROGRAMME IN LATVIA

Water monitoring during 2003-2005

Characterization of hazardous substances in water objects in year 2003
In year 2003 monitoring system included 8 river basin regions (river basins Daugava, Gauja, Venta, Lielupe, Irbe, Velikaja, Salaca, small river basins of Baltic sea and Riga gulf) and lakes separately, information covers 37 rivers and 9 lakes (82 monitoring stations in overall).

- In Daugava river near Milgravis were found increased concentration of petroleum product, concentration - 0,27 mg/l. Heavy metal concentration in all Daugava were small: for lead 0,53 – 0,85 µg/l, zinc 3,34 – 10,22 µg/l, copper 1,16 – 1,90 µg/l, cadmium 0,01 – 0,02 µg/l.
- In river Gauja were found lead concentration above limit value in 1 case reaching 3,5 µg/l. In river Memele were found increased lead concentration (max. 6,13 µg/l). Concentrations for heavy metals in Gauja river basin are low.
- In river Salaca concentrations of petroleum products and heavy metals are low except lead concentration were increased in June (max. 6,4 µg/l).
- In river Venta concentrations of petroleum products and heavy metals were low.
- In lakes hazardous substances were not found at least results of these analyses are not public available.

Characterization of hazardous substances in water objects in year 2004
From year 2004 monitoring system describes 4 river basin regions – Daugava, Gauja, Venta, Lielupe including analyses in lake water objects. In year 2004 monitoring system covers 74 water objects (20 % from total number of water objects), including 52 rivers (~25 % from total river water objects) and 22 lakes (~8 % from all lakes). Frequency of taking of water samples in year 2004 were 10 times per year in rivers but in lakes – 4 times per year. In lakes taking of samples were performed in all 4 seasons. In several rivers frequency of monitoring reached 12 times per year.

- There is mentioned nothing about monitoring priority and hazardous substances. Findings mainly are related with pollution in agricultural regions for example Lielupe river basin.
- Concentrations of heavy metals such as (Zn, Cu) in fish waters in analysed samples not exceeding normative values.

Characterization of hazardous substances in water objects in year 2005

Accordingly monitoring programme of year 2005, in water objects were analysed such hazardous substances as: mercury (Hg), cadmium (Cd), nickel (Ni), lead (Pb), copper (Cu), zinc (Zn), arsenic (As) and its compounds, as well as petroleum products (monoaromatic, non-cyclical and polyaromatic hydrocarbons). In 2005 were inspected 28 water objects. Not in all samples were analysed all mentioned hazardous substances. Usually samples were taken from 2- 6 times in the year.

- In river Daugava region hazardous substances monitoring in year 2005 were done in 7 water objects (5 of them on river Daugava). Annual average and maximal concentrations of hazardous substances has not exceed normative limit values in analysed samples. Nearest concentrations to limit value were discovered for copper (Cu) in river Liela Jugla in 19th of May.
- In river Gauja basin region hazardous substances monitoring in year 2005 were done in 5 water objects (2 of them in Gauja). Hazardous substances annual average concentrations were not exceed normative limit values except monitoring station on Gauja above Valmiera. In this place was discovered high mercury concentration (7,7 μg/l) in 22.nd of February in year 2005 which 8 times exceeded limit values. This perhaps is result of some accident because usually Hg concentrations are low in this region. Since Hg measures in year 2005 were done only 3 times, increase of annual average concentration limit values in this case are not objective indicator.
- In river Lielupe basin region hazardous substances monitoring in year 2005 were done in 8 water objects. In this region in comparison with others most often were noticed maximal concentrations of hazardous substances (Zn, Hg, Cu) what exceeding limit values.

Increases of substances are found in different rivers and only in 1 sample, it means that pollution could be risen in result of accident.

- For example in river Vilce in 2nd of February Hg concentration was 2,82 μg/l (annual average concentration was 0,98 μg/l not exceeding limit value 1 μg/l), but in river Svete on 5.th of March concentration of Cu was 18,4 μg/l (annual average concentrations was 4,3 μg/l not exceeding limit value 9 μg/l) and in river Memele concentration of Zn in 5th of December was 136,7 μg/l (annual average concentration was 33,2 μg/l not exceeded limit value 120 μg/l).
- Maximal concentrations of heavy metals in Lielupe region are higher as in other regions concentrations on average especially in case of Cu.
- In river Venta basin region hazardous substances monitoring were done in 7 water objects in year 2005. In monitoring station Barta were found rather high concentrations of Cu 15,5 μg/l (limit value 9,0 μg/l). As there were only 2 measurements taken for Cu, annual average value are not objective indicator. In overall Cu concentrations are low in water objects of this region. Other hazardous substances in this region were in the borders of normal.

Water monitoring after 2005

For year 2006– 2008 have been set 488 monitoring places overall: 63 supervisory monitoring places (33 rivers; 30 lakes); 132 operational monitoring places (88 rivers; 44 lakes). In 294 places have not set kind of monitoring (for 101 river water objects and for 133 lake water objects).

For particularly dangerous substances as Cd, Pb, Hg, Ni, petrolic products – frequency of monitoring are once in 2 months. For dangerous substances as Cu, Zn, Cl – frequency of monitoring are once in 2 months.

Frequency of monitoring in coastal and transitional water: supervisory monitoring –once in the month and operational monitoring – once in the month at least

Monitoring programme for years 2006-2008 were launched in year 2006 (confirmed with order of Ministry of Environment 24.01.2006. No.29), aiming to get information on all river and lake water objects.

Characterization of hazardous substances in water objects in year 2006

Accordingly to monitoring programm of year 2006 in water objects were analysed such hazardous substances as: mercury (Hg), cadmium (Cd), nickel (Ni), lead (Pb), copper (Cu), zinc (Zn), arsenic (As) and its compounds, as well as petroleum products (monoaromatic, non-cyclical and polyaromatic hydrocarbons). Mercury, cadmium and its compounds are particularly dangerous substances. In overall were inspected 22 water objects in year 2006. Samples were taken from 4-6 times in the year.

- In region of Daugava river basin hazardous substances monitoring were done in 5 water objects in year 2006 (4 of them on river Daugava). Quantity of above mentioned hazardous substances concentrations were found in river Lielā Jugla. Such comparatively high concentrations of hazardous substances in river Liela Jugla are every year. Water quality was assessed like appropriate because concentrations of hazardous substances are in borders of normal.
- In river Gauja monitoring of hazardous substances were done in 4 water objects (2 of them in river Gauja).
- Annual average limit value were exceeded 2 times – were found increased petroleum product concentrations on river Salaca, and lead concentrations on river Tulija. Usually concentration of petroleum products is low and indefinable – below limit of determination of method.
- In river Lielupe basin region hazardous substances monitoring were done in 6 water objects in year 2006.
- Pollution with nitrates were increased for 4 rivers in Islice, Tervete, Sesava and Musa. Similar like in other river basin regions higher concentrations were determined for zinc (Zn), copper (Cu) in comparison with annual average regulated in normatives, but maximal annual concentrations of lead (Pb) were increased 3 times in year 2006 in rivers Tervete, Memele, and Ķemeri stream.
- In river Venta basin region hazardous substances monitoring were done in 7 water objects. 3 times maximal concentrations of hazardous substances have been close to annual average limit values and 2 times for copper (Cu) these limit values have been exceeded in rivers Amula and Barta.
- Most often maximal concentrations of hazardous substances were exceeded in river Bārta in year 2006. Maximal limit value concentration for copper in river Barta were exceeded in year 2005 also.

In priority fish waters frequency of sample taking of heavy metals like zinc (Zn) and copper (Cu) were done usually from 4- 6 times in the year.

Characterization of hazardous substances in water objects in year 2007

In year 2007 surface monitoring data were obtained 238 surface monitoring stations in overall. Monitoring stations were set in 25 rivers on Daugava river basin region (40 monitoring stations), 1 canal, 78 lakes, 2 reservoirs. 15 rivers monitored in Gauja river basin region (24 monitoring stations), 8 lakes. 18 rivers monitored in Lielupe river basin region (27 monitoring stations), 1 stream, 6 lakes. 24 rivers monitored in Venta river basin region (32 monitoring stations on it), 2 canals, 15 lakes, 2 reservoirs.

Accordingly monitoring program of year 2007 in water objects were analyzed following hazardous substances: mercury (Hg), cadmium (Cd), nickel (Ni), lead (Pb), copper (Cu), zinc (Zn), arsenic (As) and its compounds as well as petroleum products.

Mercury, cadmium and its compounds belongs to particularly dangerous substances. In few monitoring stations were determined pesticides, BTEX, PAH. In overall in year 2007 were analysed hazardous substances and other pollutants in 28 surface water monitoring stations. Samples were taken from 4-6 times in the year.

- In region of river Daugava hazardous substances monitoring were done in 6 water objects in year 2007 (5 of them are located on river Daugava).
- In the region of river basin Gauja hazardous substances monitoring were done in 4 water objects and 5 monitoring stations in year 2007. 3 monitoring stations are located on the river Gauja.
- In this region maximum of higher hazardous substances concentration were found in Tūlija river. Analyses of petroleum (set index values of petroleum product hydrocarbons) were not showed pollution with petroleum products (normative limit value 0,11 mg/l).
- In the region of river Lielupe basin hazardous substances monitoring were done in 8 water objects, 9 monitoring stations in the year of 2007. 3 monitoring stations are located on river Lielupe.
- Most of above mentioned maximal concentration of hazardous substances were found in Zvirbulu stream of Kemeri bog. Analyses of petroleum were not showed pollution with petroleum products (normative limit value 0,11 mg/l).
- In the region of river Venta basin monitoring of hazardous substances were done in 10 water objects. 3 monitoring stations are located on the river Venta.
- Higher annual average concentrations of hazardous substances in all river basin regions were for such substances as lead in Lielupe river basin (9-95 % of limit value), copper in Daugava and Gauja river basin (13 – 44 % of limit value) and zinc in Daugava and Lielupe river basin (6-26 % of limit value).
- Concentrations of other hazardous substances were less – petroleum products and nickel – only 2-8% of limit value, mercury – 3-7 % of limit value, cadmium – 1-3% of limit value and arsenic – 0,4 – 0,7 % of limit value.
- Concentration of petroleum product hydrocarbons in Piedruja river of Daugava basin were not considerable because of timely rescue measures during accident in March, 2007 – hydrocarbon index values of petroleum products was not higher than annual average hydrocarbon index limit value of petroleum products (0,11 mg/l).
- In all 4 river basin region rivers concentrations of hazardous substances were not exceed the limit values therefore waters correspond to good water quality.

Taking of water samples in priority fish waters were carried out accordingly monitoring programme of year 2007 – usually 10 times in the year in rivers and 4 times in the year in lakes. Sample taking are spread equable during the whole year. In several rivers frequency of monitoring are performed 12 times in the year. Sample taking for hazardous substances as zinc and copper usually are performed from 4 till 6 times in the year.

According to requirements of regulations of Cabinet of Ministers if water sample taking are performed rarely than once in the monthly, criteria of quality should comply all samples. Total evaluation of quality is determinable after worst indicator.

Analysis of hazardous substances in wastewater

In Latvia responsible for taking analysis of hazardous substances in wastewater are wastewater treatment plants in municipalities but mostly it is duty for enterprises if it is defined in their permits of polluting activities according to Cabinet of Ministers Regulation No. 34 "Regulations regarding Discharge of Polluting Substances into Water" (22.01.2002) and according to National Environmental Monitoring program. Regulation and monitoring program foresees that industry who emitting or planning to emit dangerous substances, particularly dangerous substances or priority substances are responsible for taking samples, implement monitoring for those substances. Separate national regulation on wastewater treatment has not been elaborated.

5.3. STATE MONITORING PROGRAMME IN LITHUANIA

Water monitoring before 2004

The first ecological monitoring system was established in Lithuania in 1991- 1992 and it included water monitoring programme. Later on, in 1997 the first State environmental monitoring programme was prepared and approved. Both state environmental monitoring programmes included water monitoring part, comprising of rivers and lakes monitoring, Curonian lagoon and Baltic Sea monitoring, as well as groundwater monitoring.

Water monitoring during 2004-2010

Since 2005 water quality in Lithuanian rivers and lakes is being monitored according to a new State environmental monitoring programme for 2005-2010. The new water monitoring programme was prepared according to the requirements of the Water Framework Directive (2000/60/EC).
Water monitoring programme like the previous one, includes rivers and lakes monitoring, Curonian lagoon and Baltic Sea monitoring and the groundwater monitoring. The monitoring programme is further subdivided into reference monitoring, operational monitoring and surveillance monitoring.
According to new monitoring programme, water quality will be monitored in 360 river monitoring sites and 80 lake monitoring sites. Monitoring network is subdivided into intensive and extensive monitoring stations, where monitoring in intensive stations will be carried out several times every year, while in the extensive monitoring stations – once every 3 or 6 years, based on the rotation principle.

Rivers monitoring
Hazardous or priority hazardous substances, included in the first State environmental monitoring programme during 1997-2004 were:

1. **Heavy metals**: Zn, Cu, Cr, Pb, Ni, Hg, Cd in surface water and bottom sediments. Frequency of monitoring 4 times/year in surface water and 2 times/year for bottom sediments.
2. **Phenols**: Pentachlorphenol in surface water and bottom sediments. Frequency of monitoring in both matrixes were – 2-4 times/year.
3. **Pesticides**: DDT, polychlorbiphenyl, hexachlorocyclohexanes (α,β,δ), simazine, lindane, atrazine. Frequency of monitoring 2-4 times/year in surface water and 2 times/year for bottom sediments.

2004-2007 in rivers monitoring were included these parameters:

1. **Heavy metals**: Cd, Hg, Pb, Ni, Cr total, Cr – VI, Cu, Sn, Zn, V, Al, As in **surface water** and **bottom sediments**. Frequency of monitoring 12 times/year in surface water and 1 time/year for bottom sediments.
2. **Organic compounds**: **a)** Tetrachlormethane (CC14), Pentachlorphenol (PCP), Trichlormethane, 1,2-dichlorethane (EDC), Trichlorethylene (TRI), Perchlorethylene (PER), Benzene, Metylchlorid (Dichlormethane), Antracene, Benz(a)pyrene, Benz(b)fluoroanthene, Benz(g.h.i)perylene, Benz(k)fluoranthene, Fluoranthene, Inden(1.2.3-cd)pyrene, Naphtalene (**In surface water**) and
   b) Anthracene, Benz(a)pyrene, Benz(b)fluoroanthene, Benz(g.h.i)perylene, Benz(k)fluoranthene, Fluoranthene, Inden(1.2.3-cd)pyrene, Naphtalene (**In bottom sediments**).

The frequency of monitoring was 12 times/year for surface water and 1 time/year for bottom sediments.

3. **Pesticides**: Endosulfan, Endosulfan (α), Simazine, atrazine, DDT (DDD and DDE), Aldrin, Dieldrin, Endrin, Izodrin, Heksachlorcyclohexane (gama-HCH), Heksachlorbenzene (HCB). The frequency of monitoring was 4-12 times/year.
4. **Detergents** just in surface water, 12 times/year.
5. **Oil products** just in surface water 12 times/year
6. **Chlorinated compounds** just in surface water 1 time/year.

In **2008** there were some changes comparing with previous years:

1. **Heavy metals**: remained the same like previous years, just frequency of monitoring was 4-12 times/year in surface water and 1 time/year for bottom sediments.
2. for **organic compounds** in **bottom sediments** was added **PCB** (28, 52, 101, 118, 138, 153, 180); Frequency of monitoring was the same like previous years – 12 times/year in surface waters and 1 time/year in bottom sediments.
3. for **pesticides** there were added some new substances: **In surface water**: Pentachlorbenzene, Trichlorbenzene, Chlorfenvinfos, Chlorpyrifos, Diuron, Isoproturone, Trifluralin, Heptachlor, Heptachlorepoxide, Cis-chlordan, Trans-chlordan, Oksichlordan, Mirex, Toxaphene (P26, P50, P62). Pesticides were monitored also in **bottom sediments: DDT** (DDD and DDE) and Heksachlorbenzene (**HCB**). The frequency of monitoring was 4 times/year in surface waters and 1 time/year in bottom sediments.
4. **Detergents, oil products and Chlorinated compounds** remained the same with a frequency.

Monitoring plan for **2009** is not approved by Minister yet, but final programme on monitoring sites and substances is already prepared. In 2009 monitoring of rivers will cover following substances:

1. Monitoring for **Heavy metals** remains the same with the compounds and frequency.
2. Some new **organic compounds** will be added: Tributyltin, 4-n-nonylphenol, 4-n-octylphenol, 4-tret-octylphenol, di(-2-ethylhexyl)phtalate, hexachlorbutadiene for **surface waters** and Tributyltin in **bottom sediments**. The frequency of monitoring in surface waters 2-12 times/year, for bottom sediments – 1 time/year.
3. **Pesticide** substances and frequency remains the same like in 2008.
4. **Detergents, Oil products and Chlorinated compounds** remained the same with a frequency.

<u>Lakes monitoring</u>

Below there is listed information on main issues of lakes monitoring.

Till the 2008 no any hazardous substances were monitored in the lakes neither in the surface water nor in bottom sediments.

Preparing monitoring program for **2008** some of the hazardous substances were already included:

1. **Heavy metals:** Cd, Hg, Pb, Ni, Cr total, Cr – VI, Cu, Sn, Zn, V, Al, As in **surface water**. Frequency of monitoring 4 times/year. In bottom sediments were monitored following substances: Cr (total), Cu, Sn, Zn, V, Al, As, frequency of monitoring 1 time/year.
2. **Pesticides:** Simazine, atrazine, DDT (DDD and DDE), Aldrin, Dieldrin, Endrin, Izodrin, Hexachlorcyclohexane (gama-HCH) in **surface waters.** Frequency of monitoring 4 times/year. Just DDT (DDD and DDE) was monitored in bottom sediments, frequency of monitoring 1 time/year.

In **2009** monitoring plan for lakes covers much more hazardous substances:

1. **Heavy metals**: The same heavy metals in the surface waters and bottom sediments. Frequency of monitoring 4 times/year in surface water and 1 time/year in bottom sediments.
2. **Organic compounds**: Tetrachlormethane (CC14), Pentachlorphenol (PCP), Trichlormethane, 1,2-dichlorethane (EDC), Trichlorethylene (TRI), Perchlorethylene (PER), Benzene, Dichlormethane, Anthracene, Benz(a)pyrene, Benz(b)fluoroanthene, Benz(g.h.i)perylene, Benz(k)fluoranthene, Fluoranthene, Inden(1.2.3-cd)pyrene, Naphtalene, Tributyltin, 4-n-nonylphenol, 4-n-octylphenol, 4-tret- octylphenol, di(-2-ethylhexyl)phtalate, heksachlorbutadiene in **surface waters**; and Antracene, Benz(a)pyrene, Benz(b)fluoroanthene, Benz(g.h.i)perylene, Benz(k)fluoranthene, Fluoranthene, Inden(1.2.3-cd)pyrene, Naphtalene, PCB (28, 52, 101, 118, 138, 153, 180), Tributyltin in **bottom sediments.** Frequency of monitoring is 4 times/year in surface water and 1 time/year in bottom sediments.

The table 10 below summarizes the number of sites in rivers and lakes, in which hazardous substances were monitored (Number in the commas – sites, where **bottom sediments** where monitored for hazardous substances).

Table 10: Number of sites in rivers and lakes, in which hazardous substances were monitored

	2004 y. and before		2005 y.		2006 y.		2007 y.		2008 y.		2009 y.	
	Rivers	Lakes	Rivers	Lakes	Rivers	Lakes	Rivers	Lakes	Rivers	Lakes	Rivers	Lakes
Total No. of sites	**47-51**	**7-13**	**396**	**29**	**398**	**58**	**398**	**80**	**186**	**76**	**191**	**71**
Heavy metals	40-50 (40-50)		51 (23)		25 (25)		18 (18)		19 (14)	10 (10)	19 (10)	3 (3)
Organic compounds	20-40 (20-40)		47 (19)		14 (14)		14 (14)		16 (14)		16 (16)	3 (3)
Pesticides	20-40 (20-40)		48		14		8		8 (14)	10 (10)	10 (10)	
Detergents			5		4		4		4		4	
Oil products					2		3		2		2	
Chlorinated compounds					35		34		30		34	

Main findings of hazardous substances

Water quality with regard to hazardous substances during 1997- 2004
The material is taken from "Report on dangerous substances in the aquatic environment of Lithuania".

Metals

- Five metals: zinc, copper, chromium, lead and nickel were monitored throughout the period of 1995-2003. During this period average annual concentrations of heavy metals in all the rivers except of Kulpė river were similar and did not exceed the annual average maximum allowable concentrations (AA-MAC).
- Only in 2002 concentrations increased insignificantly, and concentration of lead in Nemunas below Smalininkai and Sidabra river at the border exceeded AA-MAC. The increase of concentrations of heavy metals was caused by the decreased of water flow in rivers, point sources of pollution and transboundary pollution.
- In river Kulpė AA-MAC of Cr and Ni were exceeded a number of times during 9 years.
- In 2003 there were few cases when concentrations of Cu, Zn, Cr, Ni and Pb exceeded AA-MAC. Higher concentrations of these metals occurred in rivers Nemunėlis, Kulpė, Šventoji, Jūra, Buka and Birvėta.
- In 2003 Kulpė remained to be polluted by nickel and chromium, what can be explained by the point sources of pollution, situated along the upper part of the river.
- In 2004 concentrations of heavy metals in the rivers not exceeded AA-MAC with some exceptions. In Nevėžis river average annual concentration of lead was 6,1 μg/l. In Kulpė river concentrations of nickel and chromium, similarly to previous years, were higher than in other rivers and were close to AA-MAC. Chromium concentrations in this river ranged from 7,4 μg/l to 7,9 μg/l, Ni – from 7,7 μg/l to 9,6 μg/l.

Pesticides

- Simazine was once detected in Nemunas river (1,15 μg/l) and exceeded AA-MAC (1μg/l).
- Lindane was detected in Nemunas, Lokysta and Nemunėlis water, where concentrations ranged from 0,01 μg/l to 0,06 μg/l.

- Lindane was detected in bottom sediments in 4 rivers - Neris, Jūra, Laukesa and Daugyvenė, where concentrations varied from 0,004 mg/kg to 1.000 mg/kg. There was only one lake Lūkšto, were lindane was detected in bottom sediments (0,002 mg/kg).
- DDT was detected 23 times in 15 rivers, where concentrations varied from 0,01 µg/l to 0,96 µg/l.
- In bottom sediments DDT was detected in 6 rivers (Žeimena, Tatula, Šešupė, Daugyvenė, Nevėžis and Bartuva), here concentrations of DDT varied from 0,0003 µg/kg to 0,010 mg/kg. DDT in bottom sediments in lakes was detected in Šventas, Lūkštas and Vištytis.
- DDE – was detected 31 times in 17 rivers, where concentrations ranged from 0,005 mg/kg to 0,120 mg/kg.

Phenols

- Pentachlorphenol was detected in 9 rivers (Nemunas, Šešupė, Šventoji, Venta, Mūša, Sidabra, Nemunėlis, Lėvuo, Birveta) where concentrations varied from 0,01 µg/l to 0,4 µg/l, and in two lakes (Tauragnų and Žuvinto).

Other hazardous substances included in the monitoring programme in rivers were detected rarely or never.

Water quality after 2005

The information is taken from the report "Lithuanian natural environment, condition, process and development".

According data of the rivers monitoring, MAC were not exceeded in any monitored site. Among new monitored parameters, involved first time into the program MAC was exceeded by trichlormethane in several sites (Šušvė at the mouth, Venta below Mažeikiai, Varduva at Griežė, Ašva in the border). The concentration of other new monitored substances was low and not exceeded MAC.

Analysis of priority substances in wastewater

According to Wastewater treatment regulation, approved by the Order of the Minister of Environment No. D1-236 on May 17, 2006, economic entities, discharging their wastewater into the sewerage systems have to determine, which hazardous substances and priority hazardous substances and at what concentrations they are present in wastewater. Furthermore, the Regulation also provides a list of parameters to be controlled according to the type of industry. Water pollution with dangerous substances reduction programme, approved by the Minister of Environment by Order No. D1-71 on February 12, 2004, also includes a list of substances, which may be discharged by certain types of industries, however in both cases not all hazardous and priority hazardous substances are covered in the lists, especially those of "new-generation" as organotin compounds, phtalates, phenols and their ethoxylates etc. Most of the substances or groups of the substances being priority or priority hazardous substances on EU level are not considered. Furthermore, the economic entities have to make an inventory of dangerous substances, applicable to their industrial sector and present this inventory in the application for IPPC permit (Order of the Minister of Environment No. 80 of 27 February 2002, changed by No. D1-330 of 29 June 2005). The frequency of monitoring of hazardous substances by industries is set in the IPPC permit. If MAC of these substances are exceeded the reduction programmes should be prepared and implemented.

6. CURRENT PRACTICES ON PERMITTING

6.1. DUTY TO CARRY OUT INVESTIGATION

There are several legal requirements regarding investigations on hazardous substances, often not directly related to permitting rather to chemical management (but still to be considered). Besides some voluntary schemes have been initiated, e.g. Responsible Care.

Investigation requirements regarding chemical management

1) Risk assessment at EU level

The concern regarding the potential risks of chemicals and in particular existing chemicals, became a policy priority in the late 1980s. The Council of the European Communities, in approving the Fourth Community Action Programme on the Environment (1987-1992), stated that one of the priority areas was the evaluation of the risks to the environment and human health posed by chemical substances. Consequently, the European Commission proposed a series of legal instruments, which were aimed at meeting the objectives outlined in the Action Programme. One of these instruments was the Existing Substances Regulation (Council Regulation No 793/93/EEC on the Control and Evaluation of the Risks of Existing Substances), which required data collection, priority setting and risk assessment activities for dangerous chemicals.

As one of the potential conclusions, a risk assessment may conclude with "substance of concern, further risk reduction measures, beyond those already in place, are required". In these cases a risk reduction strategy must be developed. One of the recent examples of the approach is introducing restrictions on the marketing and use of perfluorooctane sulfonates (PFOS). Directive 2006/122/EC relating the restrictions on marketing and use on perfluorocctane sulfonic acid (PFOS) and related compounds requires to keep under review the ongoing risk assessment activities on perfluorooctanoid acid (PFOA) and to propose necessary measures to reduce the risks if needed, investigate those industrial uses of PFOS and related compounds excluded from the restrictions. This study will also include an evaluation of the alternatives to PFOS for those uses, exempted by the restrictions such as photoresists, photographic coatings, hydraulic fluids for aviation and chromium electroplating process. This analysis will help the Commission to monitor the development of possible alternatives or technologies. The study will be finalised by the end of October 2009.

With adoption of REACH Regulation obligation to conduct risk assessments went over to industry.

2) REACH: chemical safety assessment and -report

REACH Regulation requires from registrant conducting chemical safety assessment and compilation of a chemical safety report when a substance subject to registration occurs in quantities of 10 tonnes or more per year per registrant. The chemical safety report shall document the chemical safety assessment which shall be conducted in accordance with Annex I for either each substance on its own or in a preparation or in an article or a group of substances.

A chemical safety assessment of a substance shall include the following steps:

- human health hazard assessment;
- physicochemical hazard assessment;
- environmental hazard assessment;
- persistent, bioaccumulative and toxic (PBT) and very persistent and very bioaccumulative (vPvB) assessment.

If, as a result of carrying out these steps the registrant concludes that the substance meets the criteria for classification as dangerous in accordance with Directive 67/548/EEC or is assessed to be a PBT or vPvB, the chemical safety assessment shall include the following additional steps:

- exposure assessment including the generation of exposure scenario(s) (or the identification of relevant use and exposure categories if appropriate) and exposure estimation;
- risk characterization.

The exposure scenarios (where appropriate the use and exposure categories), exposure assessment and risk characterization shall address all identified uses of the registrant.

Any registrant shall identify and apply the appropriate measures to adequately control the risks identified in the chemical safety assessment, and where suitable, recommend them in the safety data sheets which he supplies in accordance with Article 31.

Any registrant required to conduct a chemical safety assessment shall keep his chemical safety report available and up to date.

REACH regulation also foresees downstream users obligations to conduct chemical safety assessments and duty to identify, apply and recommend risk reduction measures (Article 37). A downstream user of a substance on its own or in a preparation shall prepare a chemical safety report in accordance with Annex XII for any use outside the conditions described in an exposure scenario or if appropriate a use and exposure category communicated to him in a safety data sheet or for any use his supplier advises against.

A downstream user need not prepare such a chemical safety report in any of the following cases:

- a safety data sheet is not required to be communicated with the substance or preparation;
- a chemical safety report is not required to be completed by his supplier;
- the downstream user uses the substance or preparation in a total quantity of less than one tonne per year;
- the downstream user implements or recommends an exposure scenario which includes as a minimum the conditions described in the exposure scenario communicated to him in the safety data sheet;
- the substance is present in a preparation in a concentration lower than any of the concentrations set out in Article 14 (2)
- the downstream user is using the substance for the purposes of product and process oriented research and development, provided that the risks to human health and the environment are adequately controlled in accordance with the requirements of legislation for the protection of workers and the environment.

Any downstream user shall identify, apply and where suitable, recommend, appropriate measures to adequately control risks identified in any of the following:

- the safety data sheet(s) supplied to him;
- his own chemical safety assessment;
- any information on risk management measures supplied to him in accordance with Article 32.

Where a downstream user does not prepare a chemical safety report, he shall consider the use(s) of the substance and identify and apply any appropriate risk management measures needed to ensure that the risks to human health and the environment are adequately controlled. Where necessary, this information shall be included in any safety data sheet prepared by him.

3) Information flow in the supply chain

Information flow in supply chain is required by REACH Regulation (Title IV, Articles 31 to 39). Both downstream and upstream communication is required.

Supplier of a substance or a preparation shall provide the recipient of the substance or preparation with a safety data sheet if

- substance or preparation meets the criteria for classification as dangerous in accordance with Directives 67/ 548/EEC or 1999/45/EC; or
- substance is persistent, bioaccumulative and toxic or very persistent and very bioaccumulative; or
- substance is included in the candidate authorization list for reasons other than those referred previously.

Supplier shall provide the recipient at his request with a safety data sheet if preparation is not dangerous but contains:

- in an individual concentration of ≥ 1 % by weight for nongaseous preparations and ≥ 0,2 % by volume for gaseous preparations at least one substance posing human health or environmental hazards; or
- in an individual concentration of ≥ 0,1 % by weight for non-gaseous preparations at least one substance that is persistent, bioaccumulative and toxic or very persistent and very bioaccumulative or has been included in the candidate list for authorization; or
- a substance for which there are Community workplace exposure limits.

Any downstream user shall include relevant exposure scenarios, and use other relevant information, from the safety data sheet supplied to him when compiling his own safety data sheet for identified uses.

Supplier of a substance on its own or in a preparation who does not have to supply a safety data sheet in shall provide the recipient with the following information:

- the registration number(s)
- if the substance is subject to authorisation and details of any authorisation granted or denied under same supply chain;
- details of any restriction imposed;
- any other available and relevant information about the substance that is necessary to enable appropriate risk management measures to be identified and applied.

The information shall be communicated free of charge on paper or electronically at the latest at the time of the first delivery of a substance on its own or in a preparation.

Suppliers shall update the information without delay on the following occasions:

- as soon as new information which may affect the risk management measures, or new information on hazards becomes available;
- once an authorisation has been granted or refused;
- once a restriction has been imposed.

Similar rules are applicable for hazardous substances in articles (REACH Regulation Article 33) - supplier of an article containing a certain hazardous substances in a concentration above 0,1 % weight by weight shall provide the recipient of the article with sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance. The relevant information shall be provided, free of charge, within 45 days of receipt of the request.

Any actor in the supply chain of a substance or a preparation shall communicate the following information to the next actor or distributor up the supply chain:

(a) new information on hazardous properties, regardless of the uses concerned;
(b) any other information that might call into question the appropriateness of the risk management measures identified in a safety data sheet supplied to him, which shall be communicated only for identified uses.

Distributors shall pass on that information to the next actor or distributor up the supply chain.

4) Voluntary initiatives – Responsible Care

Responsible Care is a voluntary initiative of the global chemical industry focused on improving performance, communication and accountability. Responsible Care commits companies, through their national chemical associations, to work together to continuously improve the health, safety and environmental performance of their products and processes. It is a major contribution by the industry in achieving sustainable development
Responsible Care commits chemical companies to be open and transparent with stakeholders at the local, national and international level. It encourages dialogue and cooperation, and has helped industry work much more closely with local communities, governments, trades unions, international organizations, environmental groups and others to understand and address their concerns. Responsible Care also promotes co-operation with governments and organizations in the development and implementation of effective regulations and standards, and helps companies to meet or exceed these requirements.

Product stewardship is Responsible Care applied to products, and covers more than just production and use of chemicals: it extends to other parts of the product chain such as transport, storage, use and eventual disposal. To be effective, product stewardship requires the close co-operation of everyone involved in the product's life cycle. Companies are working with their suppliers, customers, distributors and user groups to spread Responsible Care throughout the supply chain

Investigation requirements regarding environmental permitting

Water discharge which contains hazardous substances is regulated by a permit for the special use of water which takes the results of a water study into consideration. The water study is obligatory: a) in case list I substances are discharged; b) list II substances are discharged into ground water or to the area where groundwater is unprotected.

Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy foresees following investigation requirements for Member States:

- MS shall arrange for the long term trend analysis of concentrations of those priority substances listed in Part A of Annex I that tend to accumulate in sediments and/or biota on the basis of monitoring of water status. They shall take measures aimed and ensuring that such concentrations do not significantly increase in sediment and/or biota.
- MS shall determine the frequency of monitoring in sediment and/or biota so as to provide sufficient data for a reliable long-term trend analysis.
- MS shall establish an inventory, including maps, if available, of emissions, discharges and losses of all priority substances and pollutants listed in Part A of annex I to this Directive for each river basin district including their concentrations.

6.2. BREF DOCUMENTS ADDRESSING HAZARDOUS SUBSTANCES

In the European Union all official Best Available Technique Reference Notes are elaborated by the European IPPC Bureau (EIPPCB), based in Seville, Spain. There are BAT Guidelines (BREFs) adopted for 29 separate industrial sectors; for some of them revised draft versions are already available. Besides, there are 4 "horizontal" BREFs. All available BAT reference documents, lists and other relevant information can be found in EIPPCB webpage (http://eippcb.jrc.es/reference/).

In general all BREF reference documents include requirements to substitute hazardous chemicals with less hazardous ones when possible, but, of course, different industry branches have very different requirements and suggestions for use of hazardous substances.

Table 11: List of BREF documents with requirements and suggestions for use of hazardous substances

Brach of industry BREF document	Specific requirements regard hazardous substances management
"Specific" BREFs	
Cement, Lime and Magnesium Oxide Manufacturing Industries	The main concerns in this industry branch are not about hazardous chemicals in raw materials but in emissions in air which are generated by the production processes. Emission gases must be cooled rapidly to avoid formation of PCDDs and PCDFs. The rest of substances emission limitation in BREF documents mostly concern description on how to reduce SO_2, CO_2 and NO_x. Specific guidelines also exist towards co-incinerating hazardous waste, especially those with halogenated organic content >1%. In such cases BAT is considered to raise temperature above 1100 °C.
Ceramic Manufacturing Industry	In Ceramic Manufacturing Industry no hazardous substances are used in raw materials as they mostly consist of $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$, $Al_2O_3 \cdot 4SiO_2 \cdot H_2O$, $Al_2O_3 \cdot 2SiO_2 \cdot 3H_2O$ and different metal oxides (MnO_2, TiO_2, Fe_2O_3, etc.) which cannot be classified as hazardous. Main emissions from production processes into air and water are HF and SO_2 which must be limited by applying processes described in BREF.
Chlor-Alkali Manufacturing Industry	The co-production of chlorine and sodium hydroxide in fixed proportions, 1.128 tonnes of caustic (as 100% NaOH) per tonne chlorine produced, has always been a problem for the chloralkali industry. Currently the best option to deal with this is considered using chlorine absorption units that contain weak caustic soda. As a result sodium hypochlorite is produced through neutralization reactions. Other important issue is reducing Hg emissions from caustic soda leaving mercury cells. This issue is dealt with carbon filtration which allows reducing the Hg content in caustic soda to 0.05 ppm.
Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector	Waste water and gas from chemicals sector commonly is contaminated with several types of hazardous substances. The most typical are phenols, hydrocarbons/oil products and heavy metals. Specific requirements for management of these substances vary according to each type of chemicals production, but generally decontainment of waste waters include such techniques as biofiltration, oxidation (both thermal and catalytic), catalytic filtration and sorbent injections.
Ferrous Metals Processing Industry	The most hazardous substances are generated in galvanization process. This primarily includes different heavy metals and their compounds which may have toxic effects. Thresholds for each metal are set which can be reached by different techniques, described in detail in BREF documents. For water environment the most commonly used methods include sedimentation, filtration, flotation, precipitation and others. Another issue is dioxin content of dust from batch galvanizing and potential risks of dioxin build-up when these dusts are recycled. Efforts should continue to compile information and data of actual dioxin contents in dusts for normal plant operation. Dust recovery processes yielding fluxing agents free of dioxins are BAT.
Food, Drink and Milk Industries	BREF contains only general remarks about necessity to reduce the usage of hazardous chemicals (if any are used) with references to specific researches and legislation.
Glass Manufacturing Industry	Most processes do not involve the use of hazardous substances, however in some specific cases liquid NH_3 is used. Then special safety procedures must be implemented, including storage of chemicals and workplace security.
Industrial Cooling Systems	The most concerning part regarding hazardous substances in this industry sector is

	additives to the cooling liquids. The used amount of these substances must be carefully evaluated together with the chemical and toxicological properties. Common approach to reduce the use of hazardous substances is to avoid using any materials that contain Hg, Cd, Cr, wood, preserved with CCA or TBTO. In general, a very important aspect is to prevent any leakages from the cooling system.
Intensive Rearing of Poultry and Pigs	Hazardous oxidizing agents are used in oxidizing the odour compounds and providing oxygen to aerobic bacteria. It is considered BAT not to use H_2O_2, $KMnO_4$ and $NaClO_4$. Some relatively hazardous substances may be found in veterinary medicine, but they become particularly dangerous only if used after expiration date. In the past years a lot of fertilizers containing substances of high concern were used but now in most countries they are banned by legislation and cannot be used either way.
Large Combustion Plants	Large scale combustion plants are a source of many hazardous substances, but in almost all cases they are equipped with complex purification and filtration devices to minimize any impact on environment. Still, these used devices must be managed in environmentally friendly fashion, which is a part of BAT. For example, the most common means of disposal and utilization of the spray dry scrubber product are in stabilized landfills. Also, numerous amounts of heavy metals are released with ashes. The most common practice to deal with this is reuse of combustion residues and by-products to immobilize hazardous substances.
Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers Industries	Special attention needs to be given to safety issues rising from the production of fertilizers, which might, in turn, lead to considerable environmental effects. Hazardous situations may result from the improper storage, loading and use of some raw materials, especially compounds containing nitrogen (such as ammonia and nitric acid). Otherwise, a well-built plant should have a very small risk of ammonia or acidic leakage.
Large Volume Inorganic Chemicals – Solid and Others Industry	Low chlorine inventory must be maintained. All chlorine emissions are regulated by SEVESO II Directive regulations. To reduce the output of chlorine compounds, it is necessary to minimize the impurities of raw materials. Also all the filters after their use must be treated as hazardous waste.
Large Volume Organic Chemicals Industry	A lot of different hazardous substances can be generated in this industry sector, for example dioxins and PCBs. Possible BAT solutions for this include good operating conditions and low chlorine in feedstock/fuel, as well as using activated carbon and catalytic fabric filters.
Management of Tailings and Waste-Rock in Mining Activities	Not much hazardous substances involved in industrial processes, BREF only includes general references that in case of hazardous substance usage, efforts to replace them with less hazardous should be made.
Manufacture of Organic Fine Chemicals	Mass balance of all input and output materials must be made to get information about hazardous substances emissions and possibilities of replacing them. In many cases process intensification can help in reduction of reactor volume for potentially hazardous processes.
Mineral Oil and Gas Refineries	The main source of hazardous substances is from the generated waste. Different techniques exist to minimize these outputs; BREF documents give a detailed overview. These wastes should best be handed over to third-party hazardous waste contractors.
Non-Ferrous Metals Industries	Some processes often use hazardous reagents such as HCl, HNO_3, Cl_2 and organic solvents for leaching and purification. Advanced processing techniques are able to contain these materials and re-use them. Reactor sealing is an important issue in this respect. Relatively large amount of iron-based solids are generated by the leeching process. Jarosite and goethite are classified as hazardous waste because of the content of leachable elements such as Cd, Pb and As. Techniques such as compaction, the Jarofix process etc. are available to reduce the leachabilty and sometimes the permeability of the residues and they can also be treated in a pyrometallurgical process.
Production of Iron and Steel	Scrap sorting is required to minimize the risk of including hazardous or non-ferrous contaminants, particularly PCBs and oil or grease. This is normally done by the scrap supplier but the operator inspects all scrap loads in sealed containers for safety reasons, so at the same time it is possible to check, as far as practicable, for contaminants. Phenols, cyanides and aromatic hydrocarbons are also generated but most of them are biologically degraded and heavy metals are partially adsorption to the activated sludge.
Production of Polymers	Hazardous chemicals mostly occur in the generated waste; BAT is to minimize the volume of hazardous waste by good segregation and collect them to send for external treatment.
Production of Speciality Inorganic Chemicals	During production, solid hazardous compounds (e.g. solid cyanide) can build up in pipelines, machines and vessels and can ultimately provoke equipment malfunction or blockage. The rinsing water containing the hazardous material is collected in a closed piping system and stored in tanks. The rinsing water is recycled back into production when

	possible to reduce the use of fresh water as a raw material. When the solid hazardous compounds are the products manufactured in the installation, off-specification products can (if they are soluble) be dissolved in the rinsing water collecting tanks and recycled back into the process in order to reduce the amount of hazardous waste produced. Phosphorus trichloride contains organic and inorganic impurities, which are released during the production process and have to be eliminated as waste. Such waste arises as distillation residues from PCl_3 production. Such waste must be treated as hazardous and are best handed over to third-party hazardous waste companies.
Pulp and Paper Industry	Productions plants must be designed in away to give possibility of quick and reliable detection of leakage from all parts of the facility which come into contact with the hazardous pollutants. A small amount of hazardous waste is generated in all mills. Such waste include oil and grease residues, used hydraulic and transformer oils, waste batteries and other scrap electrical equipment, solvents, paints, biocide and chemical residues, etc. Normally they amount to about 0.05-0.1 kg/t of product.
Slaughterhouses and Animal By-products Industries	Waste generated by processing might contain hazardous substances and best are treated in waste incinerators. Efforts should be made to avoid and reduce the use of cleaning and disinfection agents containing active chlorine.
Smitheries and Foundries Industry	Separate storage must be applied for various incoming materials. PCDD/PCDFs can emerge from the processing but their emission levels must be kept under 0.1 ng/m^3.
Surface Treatment of Metals and Plastics	It is a general BAT to use less hazardous substances. It is BAT to substitute for EDTA by biodegradable alternatives or to use alternative techniques. Where EDTA has to be used, it is BAT to minimise its loss and treat any remaining in waste waters. For PFOS, it is BAT to minimise its use by controlling additions, minimising fumes to be controlled by techniques including floating surface insulation sections: however, occupational health may be an important factor. It can be phased out in anodising and there are alternative processes to hexavalent chromium and alkali cyanide-free zinc plating. It is not possible to replace cyanide in all applications, but cyanide degreasing is not BAT. The BAT substitutes for zinc cyanide are acid or alkali cyanide free zinc, and for cyanide copper, acid or pyrophosphate options, with some exceptions. Hexavalent chromium cannot be replaced in hard chromium plating. BAT for decorative plating is trivalent chromium or alternative processes such as tin-cobalt, however, at an installation level there may be specification reasons such as wear resistance or colour that require hexavalent chromium processing. Where hexavalent chromium plating is used, it is BAT to reduce air emissions by techniques including covering the solution or vat and achieving closed loop for hexavalent chromium, and in new or rebuilt lines in certain situations, by enclosing the line. It is not currently possible to formulate a BAT for chromium passivation, although it is BAT to replace hexavalent chromium systems in phospho-chromium finishes with nonhexavalent chromium systems.
Surface Treatment Using Organic Solvents	BAT is to*:* * use non-solvent or low solvent techniques for cleaning as described generally, and for production as described for the specific industries * minimise adverse physiological effects by replacing those with the risk phrases R45, R46, R49, R60 and R61 in accordance with Article 5(6) of Council Directive 1999/13/EC * minimise adverse ecotoxic effects by replacing those with the risk phrases R58 and R50/53 where there is a risk of emission to the environment and alternatives exist * reduce stratospheric (high level) ozone depletion by replacing those with the risk phases R59. In particular, all halogenated or partially halogenated solvents with the risk phrase R59 used in cleaning should be replaced or controlled as described * minimise the formation of tropospheric (low level) ozone by using VOCs or mixtures with a lower ozone formation potential (OFP) where other measures cannot achieve the associated emission values or are not technically applicable (such as having unfavourable cross-media effects), and when substituting as described above. However, this cannot be applied to complex formulations such as automotive paints and specific single solvent systems where no replacement exists yet, such as publication gravure. Where the OFP is not increased, substitution can be made using solvents with a flashpoint of >55 ºC.
Tanning of Hides and Skins	Only general remarks about substitution of hazardous chemicals and that efforts should be made to limit the use of sulphid compounds
Textiles Industry	BAT in bleaching is to limit the use of sodium hypochlorite only to cases in which high whiteness has to be achieved and to fabrics that are fragile and would suffer depolymerisation. In these special cases, to reduce the formation of hazardous AOX, sodium hypochlorite bleaching is carried out in a two-step process in which peroxide is used in the first step and hypochlorite in the second. Effluent from hypochlorite bleaching

	is kept separate from the other streams and mixed effluents in order to reduce formation of hazardous AOX. Alkylphenol ethoxylates should be substituted by alcohol ethoxylates or other more biodegradable substances.
Waste Incineration	BREF documents provide technical guidelines on safe storage and treatment of hazardous substances and waste, giving more detailed information on incinerating several substance groups of high concern (i.e. PCDDs).
Waste Treatments Industries	Similar to the previous industry sector, BAT includes both general and specific guidelines for waste storage, treatment and management of the by-products, as well as dealing with emissions in water and air.
"Horizontal" BREFs	
Economics and Cross-Media Effects	This BAT gives an insight on how it should be determined what is the best available option in one or other case. It focuses on calculation of cross-media effects, choosing between emissions in different mediums and calculating economical efficiency in different options. It is not oriented towards any specific industry sector and therefore doesn't give any very specific outlines regarding hazardous substances.
Emissions from Storage	BAT gives detailed description on how the hazardous substances should be stored (technical requirements on containers, labelling, risk management, etc.). No single substance or group is marked out.
Energy Efficiency	Only very general guidelines exist concerning hazardous substances, like avoiding the use of hazardous substances, e.g. where substitutes exist (such as in heat exchanging and insolating fluids). Where hazardous materials are used, managing appropriately risks in use, maintenance and decommissioning.
General Principles of Monitoring	BREF contains some remarks on how the inventory of hazardous substances should be made and describes specific cases of monitoring sites which potentially contain high level of contamination.

6.3. PERMITTING SYSTEMS IN BALTIC STATES

Environmental permitting system in Estonia

In Estonia types of environmental permits can be divided into 3 groups:

- IPPC permits: for a combined approach dealing with emissions to air, water (including discharges to sewer) and land. Goal is to achieve a high level of protection for the environment as a whole, considering the concept of Best Available Techniques. **Validity**: no termination date, but compliance to requirements must be checked annually. When needed amendments have to be made in order to update the permit according to the requirements.

Issued environmental permits are available in Internet in **Environmental Permits Information System** http://klis.envir.ee/klis.

It is also possible to apply for a single media permit or a special permit:

- Single media permits: is given for the use of a certain resource (e.g. water intake permit, mineral resource extraction permit), emitting pollutants into the environment (air pollution permit, wastewater discharge permit) or waste handling (waste generation and management permits).

- Special permit: is given temporarily and additionally on an existing ambient air pollution permit or special water permit and sets the conditions under which it is allowed for existing enterprises a certain time to exceed the emission limit values, but not environmental limit values.

The permits are issued by the Estonian Environmental Board.

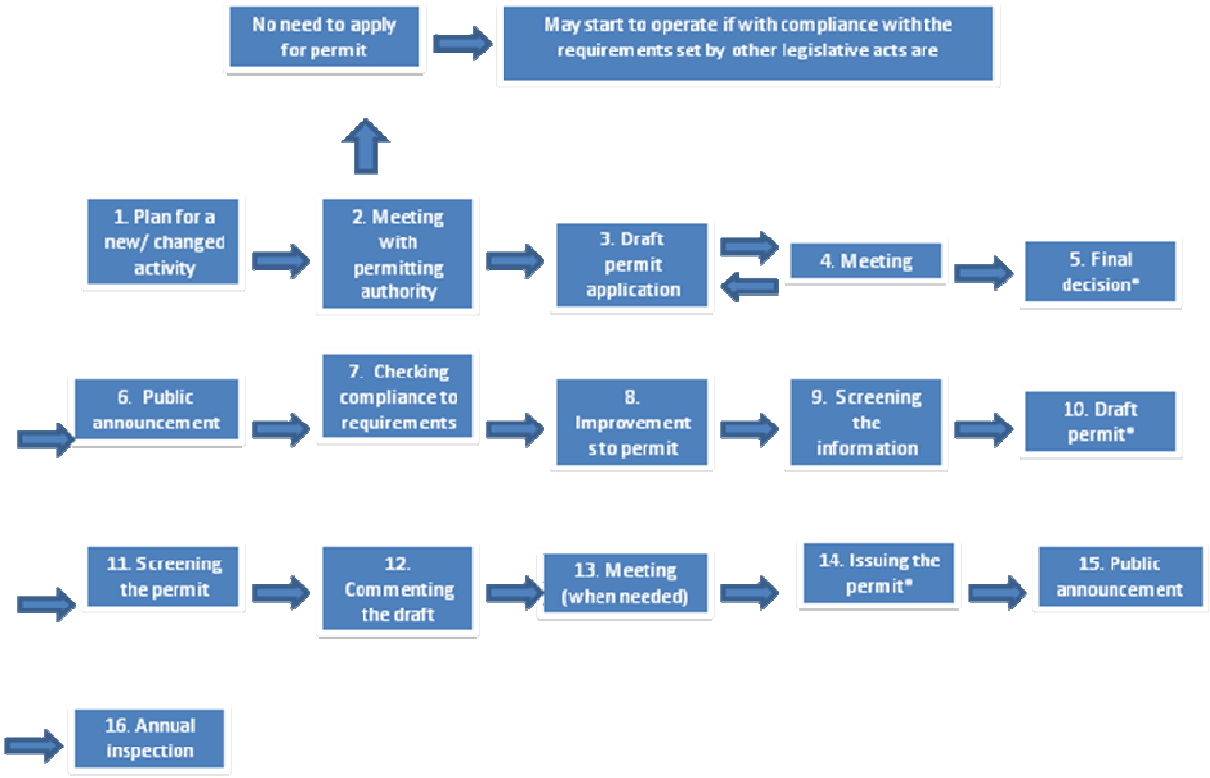
IPPC permits

Before Estonia adopted the IPPC permitting system in 2002, the permitting system was built on giving single media permits for air, water, waste and land use. Therefore moving from an emissions based approach to air and water quality to a system that enforces overall environmental improvement in companies.
Since introduction of IPPC permitting in 2002, there has been mutual influence of the content of permit applications/ permits. IPPC permit templates have most influenced air permitting system.

In 2006 it was decided that air, water and waste chapters in IPPC permit applications / permits shall be processed according to single media permit template tables. As a result, requirements for wastewater discharge issues in IPPC permits became less strict (discharge to municipal sewerages is not thoroughly considered any more).

The list for types of installations and threshold capacities for which IPPC permit is required is taken over from the EU IPPC Directive[8] Annex I. With some additional activities (plywood and fibreboard production, cattle farms) and also more stringent capacities are considered (solvent use 50 t/a instead 200 t/a, certain hazardous waste management units).

Picture 1: Process of permitting in Estonia



**Must be available for general public*

[8] COUNCIL DIRECTIVE 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control

The IPPC permit has no termination date, but a review of conditions shall be made annually by permitting authority. Any planned change in activity shall be reported to the Environmental Board prior implementing the change.

Permit application and permit content are defined by regulation of Ministry of Environment. There are 15 chapters in an IPPC application, one of them on use of raw materials and chemicals. It is needed to fill in a table listing all hazardous substances in raw materials, side materials and in semi-finished goods that are being used by industry or in the technological process. This includes information about the amount, CAS/EINECS/ELINCS number, name, classification, risk and safety phrases.

Both text and pre-defined tables templates shall be used in application. The principles are similar as in single media permitting system.
Applicant has to compare its activities with relevant BREFs and other available guidelines.
There is a specific table for that. The same table is used in permit. For some installations local BAT guidelines have been developed (plywood and fibre-board; oil-shale processing, cattle farms).

Water permits

The main legislation for regulating water protection and sustainable use of water resources is the Water act.

The water use can be either public or special, for industrial or domestic use and depending on this strict water quality requirements, main principles and obligations for water use are established for water users and for water protection against the pollution.

Public use of water body is usually free of charge, special use of water is for charge. Special use of water is use of water with technical equipment, constructions or substances affecting the state of water body.
In case of special water use the permit for special use if water (water permit) is needed and the user needs to keep account over the volume and parameters of the used water, wastewater and organize monitoring according to prescriptions of the environmental authority of the location of special use of water. Water permit is needed if water is extracted from groundwater layers or obtained for the purposes of supplying drinking water, also when mining from the water body or when influencing the natural condition of a water body in any other way.

When applying for a special water permit information describing and comparison with best available techniques is required in the application where possible.

Water Act gives definition of a „hazardous" substance with reference to toxicity, persistency and bioaccumulation, but not giving any quantitative specifications.

Discharges into public sewerage system

The Public Water Supply and Sewerage Act is the main instrument to regulate the relations between the water user and the water company. The public water supply and sewerage system can be either public or private property.

The water company is the holder of the permit and has to ensure sufficient provision of water supply and discharging of wastewater through water supply and sewerage systems. The price of wastewater services includes charge for extraction of water and charge for discharging wastewater. The price is regulated by the local government.

The supply and discharge of water into the public sewerage system is set with a contract between the client and the water enterprise according to the requirements set in the Public Water Supply and Sewerage Act. According to the Public Water Supply and Sewerage Act the specific requirements of such contract are set by the local government. The client is obliged to inform the water company about the hazardous chemicals they use and the contract will set limit values for emission of hazardous substances into wastewater.

The requirements for discharging wastewater from industrial enterprises and other enterprises using hazardous chemicals are set with the Water act (permit for special water use). When waste water contains hazardous chemicals the following information has to be provided in the special permit (set by the Water act) – maximum emission limit values, limit values during the validity period of the special permit, considering BAT the limit value of hazardous chemical in raw materials or per production unit, the monitoring measures, limit values of the hazardous chemical in the receiving water, measures described which minimise the affect of hazardous chemicals towards the receiving water.

Limit values for discharging wastewater into a water body or surface is set with a regulation of Procedure of conducting effluent to the water body or into the soil in Annex 1 and 3.

Environmental permitting system in Latvia

In Latvia 3 types of environmental permits exist. Each type of permit is required for a specific range of enterprises, mostly determined by the type and scale of industrial actions carried out; they grade in A, B and C category permits:

- Category A permits: fully compatible with Annex 1 (Categories of industrial activities related to in the Directive) of the IPPC Directive (96/61/EC) and up today around 100 enterprises have obtained this type of permit.

- Category B permits: quite similar to the A ones but are more simplified and do not require BAT to be implemented (approx. 7000 issued).

- Category C permits: required for small scaled companies with comparatively little impact on environment (e.g. gas stations) and require only basic information about companies' actions, used raw materials and emissions in water and air (several thousand issued).

All issued A and B category permits are freely available for public in the homepage of **Environment State Bureau** (http://www.vidm.gov.lv/ivnvb/ippc/Latlauja.htm), except for parts of each permit which might contain sensitive information for company

All three types of permits are issued by Regional Environmental Boards and are valid for 5 years (see Picture 2).

IPPC permits

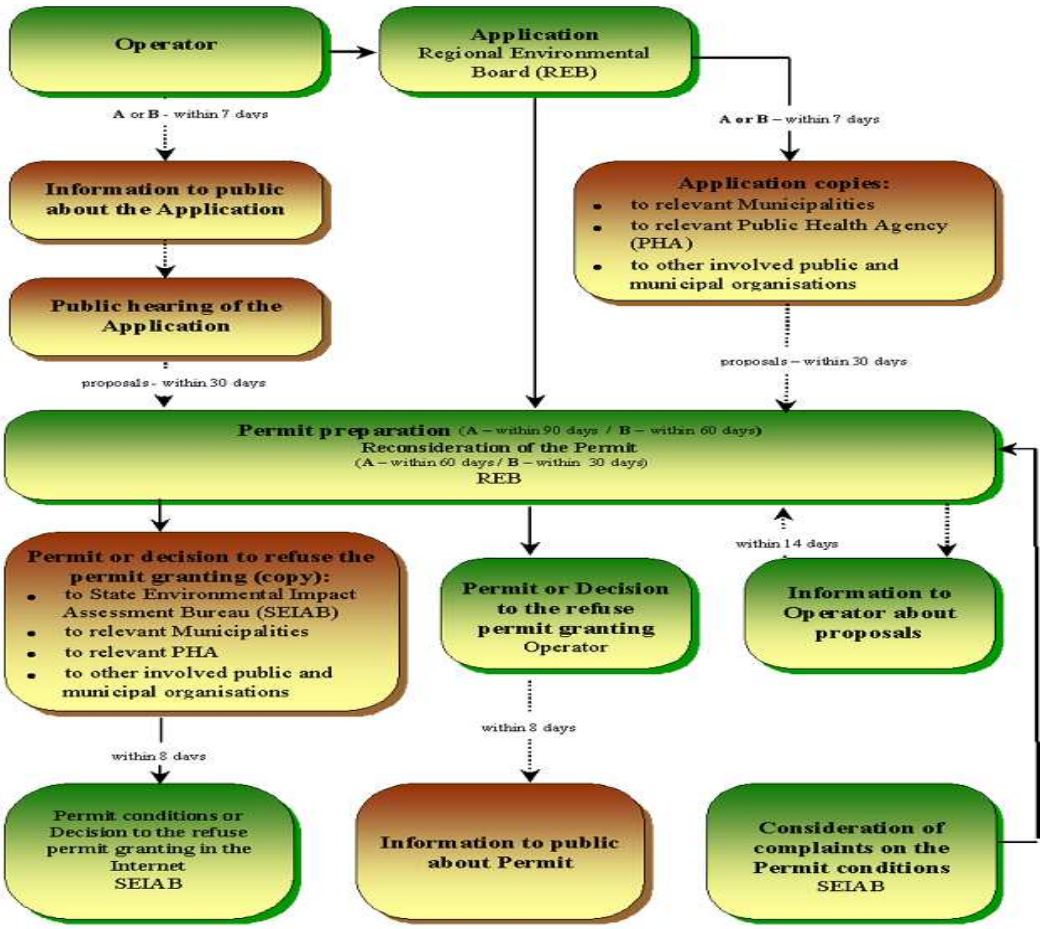
Integrated pollution prevention and control requires Latvian industries to upgrade production technologies and to operate in an environmentally friendly manner. This approach also promotes different co-operation with public and municipal authorities, as the enterprise should obtain a single permit, which conditions cover all the following issues: energy efficiency and safety measures, discharges into water and air emissions and waste management measures.

The Integrated pollution prevention and control increases efficiency of the permitting procedure and compliance with the permit conditions. Integrated permits are publicly available, so the whole permitting process becomes more transparent.

In all category A and B permits there is a separate chapter regarding to chemicals – what products are used, in what amounts and what substances are emitted into environment. If the enterprise uses any hazardous products, there is a separate form for listing them, which includes the name of the hazardous preparation can be commercial name), hazardous substances and concentrations it contains, for what purposes it is used, what are the hazard properties, R and S phrases (according to the safety data sheet) and what amounts per year are used.

No summary of used raw materials and substances exists – such information can be gathered only from separate permits. Such summary database exists only for substances emitted in air and water and is created and maintained by Latvian Environment, Geology and Meteorology Agency (LEGMA). It is based on annual reports from all companies that have obtained A or B category permits and it is also publically available at LEGMA webpage (http://www.meteo.lv/public/datu_bazes.html).

Picture 2: Process of permitting in Latvia[9]



Scheme of permitting process

[9] *Source: www.vidm.gov.lv/ivnvb*

Discharges into public sewerage system

Most of the WWTP plants and sewage systems are owned by municipalities. Every company or private household has an individual contract with the water supply and sewage systems operator (usually the same enterprise) in which the technical details, like maximum allowed discharges are stated. The price for m^3 is fixed for every municipality but it can be subject to change in case of, for example, increased contamination.

Almost all category A and a large number of category B companies have their own local waste water treatment facilities. These enterprises have special contracts with sewage and WWTP operators, indicating the quality of discharged waters, according to which the price is determined. In these contracts it can also be stated that the company discharging waste waters is responsible for making regular test analysis. The substances analysed are specific to each case and enterprise and are agreed upon closing the contract. This usually is done twice a year and in case of large emissions of specific hazardous substances.

Environmental permitting system in Lithuania

This short overview on the permitting system in Lithuania is based on the experience gained during previous projects, mainly on the "Report on dangerous substances in the aquatic environment of Lithuania", 2007, financed by the Finish environment institute. It will cover information on tree types of permits: **IPPC installations, non-IPPC installations** and **contracts between WWTP and entity.**

IPPC is regulated by the Order of the Minister of Environment No. 80 of 27 February 2002, last adopted with the Order of the Minister of Environment No. D1-693 of 29 December 2008. In Lithuania 2 types of environmental permits exist:

- to **IPPC installations** (Annex I of IPPC Directive)
- **non-IPPC installations**, exceeding certain criteria, listed in Annex II. Non-IPPC water related installations must apply for the permit, if:
  - The water intake per day exceeds 100 m^3;
  - Discharge wastewater to the surroundings (surface waters, cultivated land, etc.);
  - Discharge $\geq$ 5 m3/day of domestic or industrial wastewater to the environment;
  - Discharge hazardous substances.

Installations having IPPC permits can be found: http://aaa.am.lt/VI/files/0.566111001211368532.doc

Non-water related installations must also apply for the **non-IPPC** permit, in these cases:

- Pollution to air accounts for more than 10 tonnes per year;
- Combustion processes;
- Solvent use;
- Excavation of certain natural resources;
- Utilisation, storage or use of waste:
  1. accumulation of > 200 kg of dangerous waste per month, containing As, Cd and Hg;
  2. accumulation of > 1 tonne of dangerous waste per month, others than listed above.

An inventory of hazardous substances, applicable to their industrial sector must be present in the application for the permit. The frequency of monitoring of hazardous substances by industries is set in the permit. If maximum allowable concentration of these substances are exceeded the reduction programmes should be prepared and implemented.

The parameters in the effluents of industrial/commercial entities are controlled based on the parameters listed in the permits (both for IPPC installations and non-IPPC installations), which are usually "traditional" ones as, for example, metals, BOD, COD, total nitrogen, some PAH, VOC etc. While issuing the permit the "new-generation" pollutants (phtalates, organotins, phenols and their ethoxylates, chlorinated parafins, brominated diphenylethers) are not yet considered.

Discharges into public sewerage system

Most of the industrial installations discharge their effluents to the municipal wastewater treatment plants, which are responsible for the reaching parameters for the treated wastewater discharged to the surface waters. As it was mentioned above the "new-generation" substances do not appear neither in the permits issued for WWTP, nor in the **contracts between WWTP and entity**, and therefore they are not controlled in the effluents. Better control and enforcement of the requirements on discharges of hazardous substances on WWTP level would force them to track back the sources of the substances exceeding the limits and to revise the contracts with industrial installations.

Currently available tools – permits for use - do not provide good basis for the identification of occurrence of hazardous substances on the Lithuanian market and their use. Database, where entities, having non-IPPC permits and those, discharging $\geq$ 5 m3/day of domestic or industrial wastewater to the environment have to provide a detailed annual report on amounts of discharged water and pollutants, according to the Order of the Minister of Environment No. 408 of 20 December 1999. But this database, regarding information on hazardous substances is also very scarce.

7. OTHER RELEVANT INFORMATION

In following chapter there are described other initiatives and projects dealing with reduction of hazardous substances in water.

7.1. HELCOM PROJECTS

Here are listed names and short descriptions of on-going of finished HELCOM projects. The list was taken from HELCOM website: http://www.helcom.fi/projects/on_going/en_GB/cover/

Project: HAZARDOUS - project on hazardous substances in the Baltic Sea

Short description: HELCOM HAZARDOUS project was started in March 2006 with the aim:
1. **To identify hazardous substances** of specific concern to the Baltic Sea;
2. **To collect information on uses, discharges/emissions** to environment and concentrations in the Baltic marine environment of selected 9 organic substances from the HELCOM Contracting Parties.

Nine organic substances (Dioxins (PCDD), furans (PCDF) & dioxin-like polychlorinated biphenyls (dilPCB); Tributyltin compounds (TBT); Triphenyltin compounds (TPhT); Pentabromodiphenyl ether (pentaBDPE); Octabromodiphenyl ether (octaBDPE); Decabromodiphenyl ether (decaBDPE); Perfluorooctane sulfonate (PFOS); Perfluorooctanoic acid (PFOA); Hexabromocyclododecane (HBCDD); Nonylphenols (NP); Nonylphenol ethoxylates (NPE); Octylphenols (OP); Octylphenol ethoxylates (OPE); Short-chain chlorinated paraffins (SCCP or chloroalkanes, C_{10-13}); Medium-chain chlorinated paraffins (MCCP or chloroalkanes, C_{14-17}); Endosulfan) or substance groups were selected from numerous candidate substances in the HELCOM prioritization process during April – June 2006 and the issue was considered by HELCOM LAND 11/2006 meeting and especially the Germany, Lithuania and Sweden, which are the Lead Countries for the segment of Hazardous Substances of HELCOM Baltic Sea Action Plan (BSAP). At the later stage, the heavy metals mercury (Hg) and cadmium (Cd) were prioritized to be very relevant hazardous substances in the Baltic Sea.

The project is finished by now – a report is prepared and will be available soon. In the report there are collected information on production and use, discharges, emissions and losses to environment, concentrations in biota, sediments and water of Baltic Sea and substance specific conclusions of each of below mentioned hazardous substance. List of substances and substance groups suspected to be highly relevant to the Baltic Sea and subjected to data and information collection from Contracting Parties.

The **contact person** for this project is Mr. Jukka Mehtonen (e-mail: jukka.mehtonen@helcom.fi).
Web-page: http://www.helcom.fi/projects/on_going/en_GB/HSproject/

Project for preparation of the Fifth Baltic Sea Pollution Load Compilation (PLC-5) (2005-2010)

Short description: HELCOM regularly produces a Pollution Load Compilation which assesses the data collected by the Contracting Parties on total waterborne loads of nutrients and some hazardous substances to the Baltic Sea. The next compilation, PLC-5, will be based on data collected in the year 2006 and be published in a consistent and easily readable form which attracts scientists, administrators and the general

public. Also a popular version summarizing the air and water borne loads to the Baltic Sea shall be produced based on the results of the project combined with the airborne pollution data.

Aims of the project:
1. Quantify and describe the waterborne discharges from point sources and losses from non-point pollution sources as well as the quantified natural background losses into inland surface waters (source oriented approach) within the catchment area of the Baltic Sea.
2. Quantify and describe the loads (from rivers, unmonitored and coastal areas as well as point sources) discharging directly to the Baltic Sea (load oriented approach).
3. Evaluate changes in the pollution load since 1994.
4. Explain to which extent changes are caused by human activities or natural variations.
5. Evaluate the significance of various water protection measures applied in the Baltic Sea catchment area to reduce the pollution load from land-based sources.

The overall **task of the Project** is to draft a comprehensive assessment of the waterborne inputs to the Baltic Sea by updating the Fourth Pollution Load Compilation. The project will be carried out in three consecutive stages: Finalization of the PLC-water Guidelines; Data collection, submission and compilation; Preparation of PLC-5 Report.

Contact person for this project is Seppo Knuuttila (E-mail: seppo.knuuttila@ymparisto.fi).
Web-page: http://www.helcom.fi/projects/on_going/en_GB/plc-5/

Screening study on occurrence of hazardous substances in the eastern Baltic Sea

Short description: HELCOM has launched a screening study to assess contamination levels of hazardous substances in eastern Baltic Sea. The study will identify the levels of nine hazardous substances or substance groups prioritized by HELCOM (substances listed above in the description of HAZARDOUS project) in the coastal waters of Estonia, Latvia, Lithuania, Poland and Russia. Together with the national screenings in the western Baltic Sea, which have already been undertaken by Denmark, Finland, Germany and Sweden, the new data will be critical for closing existing information gaps on levels of hazardous substances in the whole Baltic basin.

The **screening study** was done in such way:
1. Samples were taken in eastern Baltic Sea and they were chemically measured. All substances were measured, except for dioxins, furans & dioxin-like PCBs. Occurrence of hazardous substances in marine environment were mainly analyzed in fish, but sea water was surveyed also.
2. Already existing information on occurrence and contamination levels of dioxins, furans & dioxin-like PCBs in the eastern Baltic marine environment were compiled from various sources and evaluated.

The **sampling** was done once in August-September 2008. Ten sampling sites were studied in order to assess levels of contamination in the eastern part of Baltic Sea. All chemical analyses were performed in one laboratory in order to ensure sub-regional comparability and high quality of results. Both affected and background sites were studied. Altogether 138 chemical analyses of hazardous substances in fish and 18 analyses in sea water were made.

The **project is funded** by the Nordic Council of Ministers and co-ordinated by HELCOM. It is considered an integral part of the implementation of the HELCOM Baltic Sea Action Plan (BSAP) which was adopted by the HELCOM Ministerial Meeting in Krakow in November 2007.

The HELCOM Monitoring and Assessment Group (HELCOM MONAS) has approved the project as a whole and also substances to be screened as well as on the timetable in its annual meeting in Helsinki in October 2007.

The **aim of screening activity** was:

- to promote capacity building in Estonia, Latvia, Lithuania, Poland and Russia with regard to screening as a tool to focus the actual monitoring cost-efficiently specifically to the substances of concern;
- to contribute to development of national programs for hazardous substances under BSAP to be ready by 2010;
- to contribute to the thematic assessment on hazardous substances in Baltic Sea region to be ready by 2010, including further development of indicators and necessary actions under BSAP; to serve both international purposes (HELCOM, European Marine Strategy, EU Water Framework Directive, UNEP Stockholm's POP Convention, UNECE framework for hazardous substances) as well as national activities to identify and address hazardous substances in the Baltic Sea area and to reach the cessation targets for HELCOM/EU priority hazardous substances by 2020;
- to contribute to the review of HELCOM monitoring programme on contaminants.

The short **schedule** for rest of the year:

- Preparation of Final report (e.g. results of chemical analysis) by chosen laboratory: by end of May 2009;
- Preparation of HELCOM substance-specific fact sheets: June - December 2009;
- Final workshop; dissemination of results (e.g. substance-specific HELCOM fact sheets): November 2009;
- Final report to Nordic Council of Ministers (refined substance-specific HELCOM Fact Sheets): by end of December, 2009.

Conclusions from the project will be considered during final workshop and HELCOM MONAS (Monitoring and Assessment Group) meetings with representation from all nine HELCOM Contracting Parties. Results will be included in a HELCOM thematic assessment on the hazardous substances in the Baltic marine environment. Results will be also communicated by producing HELCOM Fact Sheets aimed at the science community, policymakers and the public.

Contact person of this project is Mr. Jukka Mehtonen (jukka.mehtonen@helcom.fi).
The **web-page** of the project is: http://www.helcom.fi/projects/on_going/en_GB/hs_screening/

Holistic assessment of the Baltic marine environment, including a thematic assessment of hazardous substances (HELCOM HOLAS)

Short description: The **objective** of HOLAS is to assist the harmonized implementation of the HELCOM Baltic Sea Action Plan and thus proactively pave the way for the harmonized implementation of the European Marine Strategy Framework Directive.

Within the project, a thematic assessment on hazardous substances in the Baltic Sea will be produced by applying an indicator-based quantitative approach. The assessment will use a selected set of data on hazardous substances in the Baltic Sea area and, in line with international and national requirements, produce a quantitative tool to assess the status of the marine chemical environment.
Production of the holistic assessment of the marine environment of the Baltic Sea will be initiated by development of a strategic concept and plan for the holistic assessment. The holistic assessment will cover

all the four segments of the Baltic Sea Action Plan – eutrophication, biodiversity, hazardous substances and maritime traffic – and take into account socio-economic factors in the region. The assessment will be made available for the 2010 HELCOM Ministerial Meeting.

Further **specific objectives** of the HOLAS project are to provide support to the process of revising HELCOM monitoring and reshaping of assessment activities into indicator-based assessments which better serve the purposes of implementing the Baltic Sea Action Plan, the Marine Strategy Framework Directive and other international obligations. Additionally, the project will implement a number of measures contained in the Baltic Sea Action Plan concerning prevention of introduction and spreading of alien species in the Baltic Sea area.
The holistic assessment, including the thematic assessment on hazardous substances will be elaborated by a Task Force group consisting of experts from the Contracting Parties.
The project is funded partly by the EU.

Contact person of this project is Ms. Maria Laamanen (Phone: +358(0)207412627) and Mr. Samuli Korpinen (Phone/ +358(0)207412644).
The **web-page** of the project is: http://www.helcom.fi/projects/on_going/en_GB/HOLAS/

7.2. OTHER EU PROJECTS

Project: "Control of hazardous substances in the Baltic Sea region" (COHIBA)

Project duration: 2009 – 2011.

The overall goal of the project is to support the Baltic Sea countries in jointly implementing the Baltic Sea Action Plan with regard to hazardous substances, and to enhance the application of the ecosystem approach also to the management of hazardous substances.

The **main tasks** of the project are:
1. To identify the most important sources of the selected hazardous substances identified as being of specific concern to the Baltic Sea;
2. To analyze the flow patterns from production, processes and uses as well as to quantify inputs to the Baltic Sea of hazardous substances and to develop recommendations adopted by HELCOM for cost effective management options to reduce the discharges, emissions and losses of the selected hazardous substances;
3. To provide input to the development of national implementation programmes, serving also the requirements under the EU Water Framework Directive;
4. To provide input to the HELCOM integrated assessments on hazardous substances as a basis for decision making.

Main activities during the project:
1. Development of communication and information strategy and tools;
2. Definition and planning of the screening in details;
3. Screening of the toxicity of effluents by using WEA;
4. Screening of the 11 target substances in the chosen effluents will be performed to identify sources;
5. Harmonization of both chemicals analysis and ecotoxicological test methods;
6. Development of toxicity-based discharge limits to effluents;
7. Reporting of the results from the activities in each case study and for the whole Baltic sea region;
8. Analysis of flow patterns of the target substances;

9. fate assessment and and quantification of inputs of hazardous substances to the Baltic Sea;
10. Evaluation of management measures for the substances of concern;
11. Preparation of HELCOM guidance documents concerning the 11 substances of concern to the Baltic Sea;
12. Recommendation of management options to reduce discharges, emissions and losses in the Baltic Sea region;
13. Stakeholder mapping and training needs assessment;
14. Awareness rising on Hazardous Substances concept at E-BSR partners and selected stakeholders;
15. Training on elements of chemicals control;
16. Training on identification of source and estimation of quantities of hazardous substances;
17. Training and awareness rising on management tools/options for HS reduction.

COHIBA will be fully coordinated with other supporting EU projects on hazardous substances, building further on the results obtained from these activities. An important aspect is also the joint assessment of necessary common measures in the whole Baltic Sea region with a good status in the Baltic Sea marine environment as goal.

Contact person for this project is Ansa Pilke (ansa.pilke@ymparisto.fi), Finnish Environment Institute (SYKE).

Project: "Source control of priority substances in Europe (SOCOPSE)"

The overall objective of this project is to support the implementation process for the Water Framework Directive (WFD) by providing guidelines and decision support tools for the management of priority pollutants (PP). The partners of the project are 11 different research institutes from 9 European countries: Sweden, Netherlands, France, Spain, Norway, Poland, Finland, Slovakia, and United Kingdom.

To fulfil this overall objective the project includes the following **activities**:

- To conduct a material flow analysis for selected priority pollutants *(The selected PS (Priority Substances) comprise a variety of organic chemicals with different release patterns and include Polycyclic aromatic hydrocarbons, including Anthracene, Brominated diphenyl ethers, Mercury, Cadmium, Tributyltin, Nonylphenol (4-para-nonylphenol), Hexachlorobenzene, Isoproturon, Atrazine D(2-ethylhexyl)-phthalate).*
- To evaluate available and emerging measures and management options for PPs.
- To develop a decision support tool for identification and selection of relevant measures on European, national and regional level.
- To evaluate different potential measures by applying the decision support tools in case studies.
- To facilitate the development of collective action plans (i.e. river basin management plans) involving all stakeholders (industries, authorities, citizens, NGOs).

The results about all activities will be discussed and put in perspective, in relation to evolving policies and practice, at a final seminar. Briefing and policy-oriented notes will be distributed to selected stakeholder groups.

Web-page of the project:
http://www.socopse.se/content/theproject.4.4a4d22a41128e56161b800011039.html

Project: "Source Control Options for Reducing Emissions of Priority Pollutants (SCOREPP)"

The SCOREPP project aims to develop comprehensive source control strategies that authorities and industry can use to reduce emissions of priority pollutants (PPs) from urban areas into receiving waters, with a focus on 33 priority substances and 11 priority hazardous substances identified in the Water Framework Directive.

There are 9 different partners involved to this project from 8 countries: Belgium, Canada, Denmark, France, Slovenia, Spain, Sweden, United Kingdom.

All **activities** are planned to be covered in 10 WP: 1. User requirement analysis and dissemination to end-users, 2. Analysis of European case studies, 3. Source characteristics of priority pollutants, 4. Limiting release of priority pollutants, 5. Treatment options, 6. GIS-based identification of emission control measures, 7. Models and monitoring strategies, 8. Socio-economic evaluations of source control options, 9. Integration and comparison of emission control strategies, 10. Project Management and Co-ordination.

Contact persons of the project are Dr. Peter Steen Mikkelsen (psm@er.dtu.dk) and Birte Kastrup Rasmussen (bkr@er.dtu.dk).
Project **web-page**: http://www.scorepp.eu/index.php?option=com_frontpage&Itemid=1

Project: "Organo-Chemical Emissions from Technosphere articles – ChEmiTecs"

Project duration: from 01.12.2007 to 11.11.2010

The synthesis of the program will be summarized and analyzed in a road map for a non-toxic society where the findings from all projects will be included. The road map will define the point-of-departure and thereafter the goals and the pathways for mayor stakeholders. The synthesis will use goal-setting and back-casting methodology in order to evaluate the different parts. Workshops and interviews will be used during the whole process of the research program where both researchers and important stakeholders will be involved. The operationalisation of the results condensed in the road map will be analyzed through studies on societal, economical and institutional conditions.

Contact person of the project is: Ake Bergman (ake.bergman@mk.su.se).
Project **web-page**: http://www.miljokemi.su.se/forskning/projektdetalj?id=43&lang=eng

ANNEX 1. REFERENCES OF LEGAL ACTS

Estonian Legal Acts

Water

- WATER ACT (VEESEADUS)
- Regulation of the Minister of the Environment No. 44, Lists 1 and 2 of hazardous substances for aquatic environment (Veekeskkonnale ohtlike ainete nimistud 1 ja 2).
- Regulation of the Minister of the Environment No. 12, Maximum Limits for Dangerous Substances in Soil and Groundwater (Pinnases ja põhjavees ohtlike ainete sisalduse piirnormid).
- Regulation of the Minister of the Environment No. 17, Maximum Limits for Dangerous Substances in Surface water and Seawater (Ohtlike ainete sisalduse piirnormid pinna- ja merevees).
- Regulation of the Minister of the Environment No. 76, On Emission Limit Values for Hazardous Substances per Unit of Production (Ohtlike ainete lubatava heite piirväärtused toodanguühiku kohta).
- PUBLIC WATER SUPPLY AND SEWERAGE ACT (Ühisveevärgi ja –kanalisatsiooni seadus).
- Regulation of the Minister of the Environment No.75, Validation of the requirements concerning hazardous substances conducted to the public sewerage system (Nõuete kehtestamine ühiskanalisatsiooni juhitavate ohtlike ainete kohta).
- Regulation of the Government of the Republic No. 269, Procedure of conducting effluent to the water body or into the soil (Heitvee veekogusse või pinnasesse juhtimise kord).

Chemicals safety

- CHEMICAL ACT (KEMIKAALISEADUS)
- Regulation of the Minister of Social Affairs No. 36, Limitations for the handling of the chemicals which are hazardous for the population and for the nature (Elanikkonnale ja loodusele ohtlike kemikaalide käitlemise piirangud). *Valid till 31.05.2009, after that REACH appendix XVII.*
- Regulation of the Minister of Social Affairs No. 122, Requirements and procedure of the identification, classification, packaging and labelling of hazardous substances (Ohtlike kemikaalide identifitseerimise, klassifitseerimise, pakendamise ja märgistamise nõuded ning kord).
- Regulation of the Minister of Social Affairs No. 131, Calculation of hazardous chemicals.
- Regulation of the Government of the Republic No. 154, The Specifying list of prohibited hazardous substances in the products of concern and validated prohibitions and limitations for the products of concern (Probleemtoodetes keelatud ohtlike ainete täpsustav loetelu ning probleemtoodetele kehtestatud keelud ja piirangud).

IPPC

- Integrated Pollution Prevention and Control Act (Saastuse kompleksse vältimise ja kontrollimise seadus)

Latvian Legal Acts

Water

- Cabinet Regulation No. 858 “Regulations on typology of surface water bodies, classification, quality elements and procedures for identification of anthropogenic loads” 19.10.2004
- Cabinet Regulation No. 34 "Regulations regarding Discharge of Polluting Substances into Water" (22.01.2002)
- Water Management Law (12.09.2002)

- Cabinet Regulation No. 118 adopted on March 12, 2002 "Regulations regarding the Quality of Surface Waters and Groundwaters", with amendments until 04.10.2005

Chemicals safety

- Law on Chemical Substances and Chemical Products (01.04.1998) with amendments until 30.06.2005.
- Regulations of the Cabinet of Ministers No.532 "Criteria for Industrial Accident Assessment and Provision of Information" (19.07.2005)

IPPC

- Cabinet of Ministers Regulation No 294 adopted on July 9, 2002 "Procedures by which Polluting Activities of Category A, B and C shall be Declared and Permits for the Performance of Category A and B Polluting Activities shall be Issued"

Lithuanian Legal Acts

Water

- Wastewater treatment regulation, approved by the Order of the Minister of Environment No. D1-236 on May 17, 2006 (valid from May 26, 2006). Some changes are done: No. D1-515 on October 8, 2007 (valid from October 26, 2007 – new wording).
- Rules of reduction of water pollution by priority hazardous substances approved by the Order of the Minister of Environment No. 623 of 21 December 2001 (valid from February 9, 2002). Some changes are done: No. 267 on 22 May, 2002 (valid from June 22, 2002)
- Programme for the reduction of water pollution with dangerous substances, approved by the Minister of Environment by Order No. D1-71 on February 13, 2004 (valid from March 28, 2004). Some changes are done: No. D1-259 on May 22, 2008 (valid from May 23, 2008).

IPPC

- Regulation of IPPC permit approved by the Order of the Minister of Environment No. D1-330 of 29 June 2005 (valid from August 26, 2005).

Safety

- Profession risk regulation, approved by Minister of Social security and labour and Minister of Health protection by Order No. A1-159/V-612 of 16 October, 2003 (valid from 1 January, 2004).
- Lithuanian hygienic norm HN 23:2007 “Occupational limit values of Chemicals Substances. Common regulations on measures and impact assessment”, approved by Minister of Social security and labour and Minister of Health protection by Order No. V-827/A1-287 of 15 October, 2007 (valid form October 21, 2007).

ANNEX 2 HAZARDOUS SUBSTANCES LISTS

1 – Water Framework directive substances – Annex II of environmental quality standards directive 2008/105/EC

The Water Framework EQS directive Annex II distinguishes between priority substances* for which a progressive emission reduction is aimed at and priority hazardous substances[HS] for which the ultimate aim is the cessation or phasing out of emissions, discharges and losses. Priority substances are identified as substances causing a risk to or via the environment.

Other Pollutants** - 8 pollutants are not in the priority substances list. Environmental quality standards for these substances are included in the Commission proposal to maintain the regulation of the substances at Community level.

2 – HELCOM substances

Pesticides* - minimize and, whenever possible, to ban the use of the substances as pesticides in the Baltic Sea Area and its catchment area.

Banned substances** - prohibit, totally or partially, the use of the substances or groups of substances in the Baltic Sea Area and its catchment area.

BSAP substances[BSAP] - the actions on hazardous substances in the action plan focus on nine organic hazardous substances and two heavy metals. Under the plan, all the coastal countries will launch national programmes addressing hazardous substances - the countries will restrict uses of the selected hazardous substances and promote substitutions with less hazardous substances in industry and other sectors.

3 - Stockholm Convention

The Convention aims to protect human health and the environment from the effects of persistent organic pollutants (POPs) with a range of control measures to reduce and, where feasible, eliminate POPs releases, including emissions of unintentionally produced POPs**.** 12 POPs are listed for elimination.

4 – Rotterdam Convention

Hazardous substances listed under the Convention.

5 – Estonian national substances

Regulation of the Minister of the Environment No. 44, Lists 1 and 2 of hazardous substances for aquatic environment

List 1* - Substances whose water discharge or disposal into water in any other manner must be avoided. *Direct emission into the environment of hazardous substances is prohibited*. The discharge of hazardous substances directly into the groundwater or an area with unprotected groundwater is deemed to be direct emission. Any other type of emission is deemed to be indirect.

List 2** - Substances whose water discharge or disposal into water in any other manner *must be restricted.*

5 – Latvian national substances

Substances according to Cabinet Regulation No. 858 "Regulations on typology of surface water bodies, classification, quality elements and procedures for identification of anthropogenic loads" 19.10.2004.

Phase out* - particularly dangerous substances for aquatic environment which emissions must be phased out by 22 December 2020.

Restrictions** - priority substances which discharge into water must be restricted.

6 – Lithuanian national substances

List of priority hazardous and hazardous substances of Lithuania: Wastewater treatment regulation, approved by the Order of the Minister of Environment No. D1-236 on May 17, 2006 (valid from May 26, 2006).

Priority hazardous substances* - Priority HS in the sewage water should not exceed MAC provided in wastewater treatment regulation. The emission of these substances should be reduced and gradually phased out (not later than 31 December, 2010). It is forbidden to discharge priority HS to groundwater.
Hazardous substances** - substances in the sewage water should not exceed MAC provided in wastewater treatment regulation. The emission of hazardous substances should be reduced and gradually phased out. It is forbidden to start new activity, where is foreseen to discharge hazardous substances. It is forbidden to discharge hazardous substances to groundwater. Discharging hazardous substances from industrial sewage it is required to have a IPPC permission, to apply the pollution control and to implement reducing program in this case, if maximum allowable concentrations (MAC) are equal or higher than provided in the wastewater treatment regulation. State sewage containing hazardous substances control is carried out not less than 1 time/year. The part of IPPC permit, where is mentioned MAC of hazardous substances should be revised at least 1 time/4 years.

Substances	CAS no	1 WFD priority substances* priority hazardous substances^{HS} other pollutants**	2 HELCOM Pesticides* Banned** BSAP	3 Stockholm POPs	4 Rotterdam	5 Estonian national List 1* List 2**	6 Latvian national Phase out* Restrictions**	7 Lithuanian n Priority I Hazardo substances
Metals		Cd^{HS}, Hg^{HS}, Pb*, Ni*	Cd*, Pb*, Hg*, Se*, Cd-BSAP Hg-BSAP		Hg	Hg*, Cd*, Sb**, As**, Ba**, Be**, B**, Ag**, Co**, Cr^{4**}, Mo**, Ni**, Pb**, Se**, Tl**, Te**, Sn**, Ti**, Th**, Zn**, U**, V**, Cu**	Hg*, Cd*, Pb**, Ni**	Hg*, Cd Pb**, Ni
1,1,1-trichloroethane	71-55-6					X**		
1,2,3-trichlorbenzene	87-61-6					X*		X*
1,2,4-trichlorbenzene	120-82-1					X*	X**	X*
1,3,5-trichlorbenzene	108-70-3					X*		
1,2-dichlorethane	107-06-2	X*			X	X*	X**	X*
1,2-Dibromoethane	106-93-4		X*		X			
2,4,5-T	93-76-5		X*		X			
3,4-dichloranilin	95-76-1							X**
Acrylonitrile	107-13-1		X*					
Alachlor	15972-60-8	X*				X**	X**	X**
Ammonia	7664-41-7					X**		
Anthracene	120-12-7	X^{HS}				X**	X**	X**
Absorbable organic halides (AOX)								
Aramite	140-57-8		X*					
Asbestos	77536-66-4, 77536-67-5, 12172-73-5, 12001-28-4, 77536-68-6				X			
Atrazine	1912-24-9	X*				X**	X**	X**
Azinphos-ethyl	2642-71-9					X**		
Azinphos-methyl	86-50-0					X**		
Benzene	71-43-2	X*				X**	X**	X**
Benomyl	17804-35-2				X			
Binapacryl	485–31-4				X			

Captafol	2425-06-1				X			
Carbofuran	1563-66-2				X			
C_{10-13}-chloroalkanes	85535-84-8	X^{HS}	BSAP				X*	X**
C_{14-17}-chloroalkanes	85535-85-9		BSAP					
Chlorobenzilate	510-15-6				X			
Chlordane	57-74-9		X*	X	X	X**		
Chlordecone	143-50-0		X*					
Chlordimeform	6164-98-3		X*		X			
Chlorfenvinphos	470-90-6	X*				X**	X**	X**
Chlorpyrifos	2921-88-2	X*				X**	X**	X**
Cyanides								
DDT and derivates DDE and DDD	50-29-3	X**	X**	X	X	X*	X*	X*
Dibutylphtalate	84-74-2							X**
Di(2-ethylhexyl)phthalate (DEHP)	117-81-7	X*					X**	X**
Dichloromethane	75-09-2	X*				X**	X**	X**
Dichlorvos	62-73-7					X**		
Dinitro-ortho-cresol and its salts	534-52-1, 2980-64-5, 5787-96-2, 2312-76-7				X			
Dinoseb and its salts and esters	88-85-7				X			
Dioxins			BSAP	X				
Diuron	330-54-1	X*				X**	X**	X**
Drins (aldrin, dieldrin, endrin, isodrin)		Aldrin**, dieldrin**, endrin**, isodrin**	Aldrin*, dieldrin*, endrin*, isodrin*	aldrin, dieldrin, endrin	aldrin, dieldrin,	Aldrin*, dieldrin*, endrin*, isodrin*		Aldrin*, diel endrin*, isod
Endosulfan	115-29-7	X^{HS}	BSAP			X**	X**	X**
(alpha-endosulfan)	959-98-8						X**	X**
Ethylene oxide	75-21-8				X			
Ethylenediaminetetraacetate (EDTA)	60-00-4							X**
Fenitrothion	122-14-5					X**		
Fenthion	55-38-9					X**		
Fluoroacetamide	640-19-7				X			
Fluoroacetic acid and derivatives	766-439-3, 144-49-0		X*					
Formaldehyde	50-00-0						X*	

Furans			BSAP	X				
HCH (Hexachlorocyclohexane)	608-73-1	X^{HS}			X	X*	X*	X*
Hexachlorbenzene (HCB)	118-74-1	X^{HS}		X	X	X*	X*	X*
Hexachlorbutadiene (HCBD)	87-68-3	X^{HS}				X*	X*	X*
Heptachlor	76-44-8		X*	X	X	X**		
Indene	95-13-6					X**		
Isobenzane	297-78-9		X*					
Isoproturon	34123-59-6	X*				X**	X**	X**
Kelevan	4234-79-1		X*					
Lindane	58-89-9				X	X*	X**	X*
Malathion	121-75-5					X**		
Methamidophos (certain formulations)	10265-92-6				X			
Mirex	2385-85-5			X		X**		
Monoaromatic hydrocarbons (benzene, toluene ethylbenzene, xylenes) with a summary indicator BTEX							X**	
Monocrotophos	6923-22-4				X			
Morfamquat	463-683-3		X*					
Naphthalene	91-20-3	X*				X**	X**	X**
Nitrites						X**		
Nitrophen	183-675-5		X*					
Nonylphenols	25154-52-3	X^{HS}	BSAP				X*	X**
(4-(para)-nonylphenol)	104-40-5	X^{HS}					X**	X**
Nonylphenol ethoxylates (NPE)	9016-45-9		BSAP					
Octylphenols	1806-26-4	X*	BSAP				X**	X**
(para-tert-octylphenol)	140-66-9	X*					X**	X**
Octylphenol ethoxylates (OPE)	9036-19-5		BSAP					
Quintozene	82-68-8		X*					
PAH		X^{HS}					X*	
(Benzo(a)pyrene)	50-32-8	X*				X**	X**	X**
(Benzo(b)fluoranthene)	205-99-2	X*				X**	X**	X**

(Benzo(g,h,i)perylene)	191-24-2	X*				X**	X**	X**
(Benzo(k)fluoranthene)	207-08-9	X*				X**	X**	X**
Fluoranthene	206-44-0	X*				X**	X**	X**
(Indeno(1,2,3-cd)pyrene)	193-39-5	X*				X**	X**	X**
Parathion	56-38-2				X	X**		
Parathion-methyl	298-00-0				X	X**		
Petroleum non-cyclic hydrocarbons							X**	
Pentachlorobenzene	608-93-5	X^{HS}				X**	X*	X**
Pentachlorphenol (PCP)	87-86-5	X*	X*		X	X*	X**	X*
Perfluorooctane sulfonate (PFOS)			BSAP					
Perfluorooctanoic acid (PFOA)			BSAP					
Phenols (cresols, o-cresol, m-cresol, p-cresol, xylenols, ethylphenols, monochlorophenols, dichlorophenols, trichlorophenols	95-48-7, 108-39-4, 106-44-5					X**	X**	
Phosphamidon	13171-21-6				X			
Phosphorus	7723-14-0					X**		
Polybrominated diphenyl ethers or PBDE ((hexa-); (octa-); (deca-); (penta-))	36355-01-8, 27858-07-7, 13654-09-6 32534-81-9	X* (penta X^{HS})	BSAP (octa) (penta) (deca)		X			
Polychlorinated biphenyls (PCB)	1336-36-3		X** (certain cases)	X	X	X**	X*	
Polychlorinated terphenyls (PCT)			X** (certain cases)		X			
Polychlorinated terpenes	8001-50-1		X*					
Silicon	7440-21-3					X**		
Simazine	122-34-9	X*				X**	X**	X**
Tetrachlorethylene	127-18-4	X**				X*		X*
Tetrachlormethane	56-23-5	X**				X*		X*
Tetraethyl lead	78-00-2				X			
Tetramethyl lead	75-74-1				X			
Tetrasodium ethylenediaminetetraacetate	64-02-8							X**

Thiram	137-26-8				X			
Toxaphene	8001-35-2		X	X	X	X**		
Tributyltin compounds		X^{HS}	X** BSAP			X**	X*	X**
(Tributyltin-cation)	36643-28-4	X^{HS}					X**	X**
Trichlormethane (chloroform)	67-66-3	X*	X			X*	X**	X*
Trichlorobenzenes	12002-48-1	X*						X*
Trichloroethylene	79-01-6	X**				X*		X*
Trichloronitromethane	76-06-2					X**		
Trifluralin	1582-09-8	X*				X**	X**	X**
Triphenyltin compounds	668-34-8		BSAP					
Tris (2,3-dibromopropyl) phosphate	126-72-7				X			

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