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National Implementation Plan for the Management of Persistent Organic Pollutants in the Period 2009 − 2013

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ACRONYMS AND ABBREVIATIONS

International organizations, conventions and the Slovenian laws

AC	Aarhus Convention
ADR	European Agreement concerning the international carriage of dangerous goods by road
BC	Basel Convention
CEECs	Central and Eastern European countries
CEFIC	European Chemical Industry Council
CLRTAP	Convention on Long-Range Transboundary Air Pollution
EC	European Commission
EMEP	Cooperative Programme for Monitoring and Evaluation of Long-range Transmission of Air Pollutants and Europe
EEA	European Environment Agency
ES	European Community
EU	European Union
GEF	Global Environmental Facility
IFCS	Intergovernmental Forum on Chemical Safety
ILO	International Labour Organisation
IPCC	Intergovernmental Panel on Climate Change
IPCS	Intergovernmental Programme on Chemical Safety
IPPC	Integrated Pollution Prevention and Control
IUPAC	International Union of Pure and Applied Chemistry
NIP	National Implementation Plan
NPVO	National Environmental Protection Action Programme
NPZV	National Health Programme
OECD	Organization for Economic Cooperation and Development
RIPO	Protocol on Pollutant Release and Transfer
RC	Rotterdam Convention
SC	Stockholm Convention
UN ECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WFD	Framework Water Directive
WHO	World Health Organization
ZFfS	Plant Protection Products Act
ZKem	Chemicals Act
ZV	Waters Act
ZVMS	Veterinary Compliance Criteria Act
ZVO	Environmental Protection Act

Chemical compounds and mixtures

HCFC	Chlorofluorocarbons
POPs	Persistent organic pollutants
PCB	Polychlorinated biphenyls
PCT	Polychlorinated terphenyls
PBB	Polybrominated biphenyls
PTS	Persistent toxic compounds
PBTs	Persistent, bioaccumulative, toxic substances
OCCs	Organochlorinated compounds
OCPs	Organochlorinated pesticides
ALD	Aldrin
CHL	Chlordane
DIE	Dieldrin
DDTs	Σ DDT + DDE + DDT
DDT	p, p´-DDT (4.4'-DDT) = 1,1,1-trichlor-2.2-bis (4-chlorophenyl) ethane
DDE	p,p´-DDE = 1.1-dichloro-2.2-bis(4-chlorophenyl) ethylene - product of dehydrogenochlorination
DDD	p,p´-DDD = 1.1-dichloro-2.2-bis(4-chlorophenyl) ethane - product of dechlorination
END	Endrin
HPT	Heptachlor
HCB	Hexachlorobenzene
HCH	Lindane
MIR	Mirex
TOX	Toxaphene
FLR	Fluorene
PHE	Phenanthrene
ANT	Anthracene
FLU	Fluoranthene
PYR	Pyrene
PBDEs	Polybrominated diphenyl ethers
PAHs	Polycyclic aromatic hydrocarbons
NAP	Naphthalene
PCP	Polychlorinated phenols
PeCP	Pentachlorophenol
PCTs	Polychlorinated terphenyls
PCDDs/Fs	Polychlorinated dibenzo-p-dioxins and dibenzofurans
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans

	D – Di, Tr – Tri, T – Tetra, Pe – Penta, Hx – Hexa, Hp – Hepta, O - Octa
DL PCBs	Dioxin-like polychlorinated biphenyl dioxins
PPP	Plant protection products
D/F	Dioxins/furans
PCDD/PCDF	Polychlorinated dibenzo-p-dioxins / Polychlorinated dibenzofurans
NMVOC	Non-methane volatile hydrocarbons
VOC	Volatile hydrocarbons
DDT	Dichloro-diphenyl-trichloroethane
EDC	1,2-dichloroethane
VCM	Vinyl chloride, monomer, monomer
TCDD	2,3,7,8-tetrachlordibenzo-p-dioxin
PVC	Polyvinyl chloride

Parameters and other

ADI	Acceptable Daily Intake
BAF	Bioaccumulation factor
BAT	Best available technology
BCF	Bioconcentration factor
BEP	Best environmental practice
LOD or LOQ	Limit of determination
MRL	Mmaximum residue level
TEF	Toxic equivalent factor
TEQ	Concentration of toxic equivalent TCDD
TWI	Tolerable Weekly Intake

National institutions

ARSO	Environmental Agency of the RS
ACTRP	Agency of the RS for Agricultural Markets and Rural Development
FURS	Phytosanitary Administration of the RS
GZS	Chamber of Commerce and Industry of Slovenia
IRSKGH	Inspectorate for Agriculture, Forestry and Food of the RS
IRSOP	Inspectorate for the Environment and Spatial Planning of the RS
IVZ	Institute of Public Health of the RS
IVRS	Water Institute of the RS
KIS	Agricultural Institute of Slovenia
MG	Ministry of the Economy
MKGP	Ministry of Agriculture, Forestry and Food
MOP	Ministry of the Environment and Spatial Planning
MP	Ministry of Transport
MZ	Ministry of Health

MZZ	Ministry of Foreign Affairs
RS	The Republic of Slovenia
URSK	National Chemicals Office
URSVN	Administration of the RS for the Protection of Nature
VURS	Veterinary Administration of the RS
ZIRS	Health Inspectorate of the RS
ZZV	Health Protection Institute

Other

BDP	Gross Domestic Product
CORINAIR	(European methodology for) CORe Inventory of AIR emissions
DEE	National Emissions Inventories
EMAS	Community Eco-management and Audit Scheme
EPER	European Pollutant Emission Register
EUCIS	European Customs Information System
EUROSTAT	European Statistical Office
MAP	Mediterranean Action Plan
NVO	Non-governmental Organizations
REC	Regional Environmental Centre for Central and Eastern Europe
SDP	System for Determining Paths
SEA	Socio-economic analysis
SFRY	Socialist Federative Republic of Yugoslavia
SURO	Strategic guidelines for waste management in the RS

SUMMARY

National Implementation Plan for the Management of Persistent Organic Pollutants (hereinafter referred to as NIP) is the basic strategic document covering the field of persistent organic pollutants. Its objective is overall improvement of public health and protection of the environment. To this end, the plan defines goals in specific areas within certain time periods, and priorities and actions to achieve these goals. The National Implementation Plan is prepared on the basis of the Stockholm Convention on Persistent Organic Pollutants, and the Regulation of the European Parliament and of the Council No 850/04 on persistent organic pollutants. By NIP, the State as Party to the Stockholm Convention, fulfils its obligations concerning the transposition of the EU *acquis* to the Slovenian law, and, on the other hand, sets operational goals and measures related to persistent organic pollutants defined in this document.

The NIP thus resumes the situation on the exposure to persistent organic pollutants in Slovenia, defines the vision for the future conduct in this area and guidance as well as measures for the realization of this vision from 2009 to the end of the 2013.

Stockholm Convention on Persistent Organic Pollutants

Between 22 May 2001 and mid-March 2009, the Stockholm Convention on Persistent Organic Pollutants (hereinafter referred to as SC) was signed by 152 countries and ratified by 162 countries with the intention to eliminate or limit the production and use of twelve chemicals. The Convention entered into force on 90th day after the fiftieth ratification, 17 May 2004. The text of the Convention is available in the Official Gazette of RS No 32/2004, International Agreements No 9, or on the link: http://chm.pops.int/Portals/0/Repository/conf/UNEP-POPS-CONF-4-AppendixII.5206ab9e-ca67-42a7-afee-9d90720553c8.pdf. Lists of selected intentionally produced substances are in Annexes A and B, while Annex C lists unintentionally generated substances released into the environment as contaminants resulting from combustion or technological processes.

POP substances covered by the SC include pesticides: aldrin dieldrin, endrin, DDT, heptachlor, mirex, toxaphene, chlordane and hexachlorobenzene, industrial chemicals hexachlorobenzene and polychlorinated biphenyls, and unintentionally generated by-products of combustion or technological processes: dioxins, furans, hexachlorobenzene and polychlorinated biphenyls. Basic data on the properties of these substances covered by the National Implementation Plan for the management of the existing pollutants in the RS are provided in Annex 1. Manufacture and use of organochlorinated pesticides containing POP substances in Slovenia was going on between 1957 and 1988. Aldrin, dieldrin, and endrin were used in the production of the plant protection products (PPP). There is no information on the particular use of PPP in Slovenia, as data refer to the total use in SFRY. Mirex was not produced or used in the territory of Slovenia. Polychlorinated biphenyls were used in the period between 1962 and 1984.

Overview of the situation in the field of POP substances in Slovenia

The situation in the environment

Maximum levels of POP substances were harmonised with the strictest standards of developed countries already when Slovenia was still part of the SFR Yugoslavia. At that time, the republics held no records of the PPP use; however, the former state banned most PPP with POP substances by 1973. Today, the ceilings and the sampling methods used for inspection are complying with the EU regulations.

Plant protection products with POP substances

In the period of the former common state, SFRY, most PPP with POP substances were banned by 1973 (with some exceptions, by 1982), while endrin (rodenticide) was banned by the year 1989. Most preparations in use were based on DDT and endrin. At that time, individual republics had no records on the use of PPP.

Today, the Republic of Slovenia is assuming the entire EU legislation. The PPP registration is done in line with the national and the EU regulations. In the procedure of registering individual PPP, the FURS assesses the risks it represents for the health of the people and the environment if used in Slovenia. On the proposal of the commission for plant protection products and in agreement with the National Chemicals Office, the Phytosanitary Administration either approves the registration of PPP or rejects it.

Resulting from the use of pesticides until 1990, the monitoring of residues with POP substances in certain elements of the environment indicated, at some sampling points, the occurrence of DDT and endrin in water, suggesting the source of POP substances in the soil. Systematic research of soil samples did not confirm these assumptions; neither has research shown any increased levels of POP substances in agricultural products. The emergence of POP substances in some water samples could result from improperly deposited PPP, but no pertaining data are available.

As regards pesticide residues in foodstuff and agricultural products, a national programme of monitoring is being implemented since 1999. It ensures regular, coordinated and systematic verification of the values of pesticides and their residues in foodstuff and agricultural products. Regular monitoring of pesticides in foodstuff, fodder and drinking water did not establish exceeded maximum values of POPs.

Old PPP stockpiles

A survey among the sellers and users of PPP showed rather small amounts of PPP containing POP substances. The sellers do not have old PPP stockpiles with POP substances, while farms reported a stockpile of approximately 90 kg or L of PPP with POPs as active ingredients. Most stockpiles contain substances as DDT and endrin. Collection and disposal of these quantities have been envisaged in the Action Plan.

PCB

Slovenia adopted the basic provisions of the EU Directive on the disposal of polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCT) and included them in its legislation. This represents a commitment for Slovenia to completely abandon PCBs by 2010. Within this time limit, the installations have to be replaced

with those that do not contain PCBs, or decontaminated in the prescribed way. The MOP record of registered holders of PCB installations and waste showed that by the end of 2003, the total quantity of exports and removal of PCB abroad was 899,710 kg. By the end of 2004, the database contained 157 registered holders of PCB equipment, where the remaining quantity of PCBs to be removed is 118,503 kg. We estimate that all major PCB holders are included in the records.

In line with the EU legislation, the Ministry of Environment and Spatial Planning adopted a platform for the collection and disposal of equipment with PCBs / PCTs whose volume is less than 5 dm^3 PCB / PCT (diffuse sources). The quantity of diffuse sources of PCBs in households and other entities (industry) in Slovenia is estimated to about 215,600 kg. Procedures expected to regulate the management of separately collected fractions in performing the public service of municipal waste management, with mandatory collection and segregation of hazardous fractions of municipal waste, and management of waste electric and electronic equipment, which will also regulate organized collection of diffuse sources of PCB, have not been initiated yet.

Manufacture of devices containing oil with PCB in Slovenia took place in one company - between 1962 and 1985. 169.9 tonnes of unused PCB were removed in 1985 by burning - D10 (France), and 70 tonnes of PCBs were emissions and landfill waste in the area around Semič. Unfortunately, during the operation of the company (Iskra kondenzatorji Semič), there was uncontrolled disposal and management of raw materials, products and wastes with PCB, and, consequently, contamination of water. Contamination was limited to a narrow area surrounding the factory and the Krupa River basin. Upon discovering the contamination of water in 1985, safety measures were introduced immediately in order to protect the health of people and remedy the environment. Contaminated soil, waste, semi-finished products and products of the factory Semič were collected and permanently stored. Today, no increased levels of PCBs are found in the air, soil, or agricultural products, except occasionally. In water emergency situations, the river Krupa still contains PCBs. Although such occasions are rare, the unpredictability of such events prevents permanent withdrawal of all the safety measures in the polluted area.

Monitoring of environmental contamination with PCBs in Slovenia is done by the Environmental Agency of the Ministry of Environment and Spatial Planning. Data include the results of measurements of water resources, surface waters and their sediments for the period 1986 − 2002. Data on PCB levels in soil were taken from two comprehensive studies, and in 2004, the regular monitoring was extended to include soil. Methodology and sampling points varied during this period, however, the measurements have shown no exceeded limits, with the exception of the Semič area.

Waste

The Environmental Agency of the RS keeps records of legal persons involved in treatment collecting and disposing waste, waste transporters, legal persons who take care of waste management, suppliers of batteries, producers of electric and electronic equipment, persons authorised for waste assessment, and the inventory of PCB installation. The above stated entities are obliged to submit annual reports on waste management in the preceding calendar year. Information on the amount of waste and the lists of persons are available on their websites. Unfortunately, the

classification of waste does not allow mass balance of PPP waste. Any natural or legal person engaged in business with PPP, or managing the equipment containing PCBs must ensure the proper management of hazardous waste by signing a contract with waste collection or disposal company, holding the permits for this activity by the Ministry of Environment and Spatial Planning. Identification of hazardous waste landfills and preparation of a programme for their rehabilitation is envisaged in the national strategic plan for waste management and the plan for rehabilitation of illegal waste dumping areas. This has not been realised yet due to scarce financial resources.

Unintentionally produced POP substances

Unintentionally produced POP substances are released into the environment mostly as emissions from industrial plants. Slovenia has fully harmonised its obligations and legal provisions governing the sphere of POP emissions with the applicable European regulations and guidelines. The legal basis for the activities regulating this field is the Protocol on Persistent Organic Pollutants to the Convention on Long-Range Transboundary Air Pollution of 1979, which Slovenia has taken over as a successor to Yugoslavia.

ARSO, the agency which collects data and prepares emission inventories, works with various professional institutions in Slovenia.

Two types of emission data or databases exist in ARSO. National emission inventory includes systematically collected emission data for the entire country, and the REMIS register is used for monitoring emissions from industrial plants. The single European CORINAIR methodology is used for monitoring the emissions.

The current weakness in managing unintentionally produced POPs derives from the unsystematic approach to measurements and overall unreliability, as the information obtained is the result of statistics and of more or less suitable selection of emission factors. The issue has already been tackled. The records of all POPs emissions covering the period from 1990 to 2006 show a steady reduction of all the said substances.

The situation in the field of information, awareness and education

Slovenia does not have a special institutional system for the field of information, awareness raising, education, cooperation and training on POPs. All these obligations in the Slovenian law are regulated at the level of programme documents. In most cases, the existing institutions and administrative bodies entrust the activities (such as preparing the texts for educational and information publications, providing professional support for the organisation and management of databases) to external technical staff and subcontractors. Slovenia still has no clear policy or strategy for education, awareness and training about POPs (except PCB and PCT), therefore this sphere is covered by Action Plan. The National Chemicals Office provides maintenance of websites with links to databases promoting information, awareness raising and education of the public.

All the ministries have a department for public relations and prepare annual work plans. Pursuant to the Access to Public Information Act, all the ministries and their bodies employ a person who provides this kind of information. The existing capacities

of POPs information exchange in Slovenia were linked to the application of the legislation on the monitoring of emissions into various elements of the environment. In terms of specific information on POPs in Slovenia, these institutions did not publish special education, information or awareness raising publications or other materials on POP substances. The sphere of information, education, awareness, cooperation and training of different actors is quite fragmented and dispersed due to different levels of capabilities. The present situation shows that, currently, no system has been put in place to enable efficient, comprehensive and high quality work in the field of POP.

Health status of the population

Given the existing control, methods and the prescribed maximum values, the health of population in Slovenia is not directly at risk, according to the current medical doctrine. A review of the existing data nevertheless indicates lack of information on the quantities of POPs substances in human tissues. A special problem is lack of data on the Semič area which was exposed to PCB emissions in the past. Similarly, there are no systematic and internationally comparable data on the amounts of PCBs and dioxins in breast milk. In general, Slovenia lacks systematic research of links between the environmental pollution and the health of the population. Only the analyses of food samples (which have to comply with the prescribed maximum values of dioxins and dioxin-like PCB amounts) carried out within the official foodstuff control, suggest that the population is more exposed to PCB or dioxins and furans than in other Central European countries. However, there is not enough data on the potential PCB contamination of foodstuffs in the areas where the environment is more contaminated, particularly foodstuffs with no prescribed maximum values.

Socio-economic impacts

An analysis of socio-economic impacts as imposed by the Stockholm Convention has not been performed in Slovenia yet. The overview of impacts provides, by groups of POPs substances under section 2.3.11, a list of the major socio-economic impacts and anticipates the scope of the socio-economic analysis. The review is not final yet, because data on the current exposure of the environment and the population in Slovenia is not available. Only with the help of this data, in combination with the planned measures, can the socio-economic impact assessment be elaborated.

The actions envisaged

The problems associated with POP substances in the Republic of Slovenia, and the actions planned with regard to POP substances which result from the review of the situation in the Republic of Slovenia and which in the course of the project proved to be essential, are included in the 3rd section of NIP with the proposed phases of realization in short-term, medium-term and long-term periods.

1 INTRODUCTION

1.1 The Project of preparing the National Implementation Plan for the Management of Persistent Organic Pollutants

Draft National Implementation Plan for the Management of Persistent Organic Pollutants (POPs) in the Republic of Slovenia, based on the Stockholm Convention, was prepared within the project UNEP/GEF No GF/27322-02-4463.

The project developer in Slovenia was the National Chemicals Office at the Ministry of Health, which also performed economic, financial and organizational tasks. The Ministry of the Environment and Spatial Planning closely cooperated in the preparation of the Plan. The project operators included representatives of ministries and their bodies, administrative institutions, experts from universities, institutes and public institutions, NGOs and companies which expressed interest in the preparation of the implementation plan.

HEAD OF PROJECT:

Dr. Marta Ciraj, Director,
Ministry of Health, National Chemicals Office
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The purpose of the project:

The basic purpose of the project is to assist the Republic of Slovenia in implementing the Stockholm Convention, and in particular, in the preparation and the adoption of the National Implementation Plan for the Management of Persistent Organic Pollutants (hereinafter referred to as NIP POPs).

Project objectives

The Stockholm Convention on Persistent Organic Pollutants stipulates that each Party to the Convention shall:

- Readiness for the implementation of its obligations under this Convention,
- Transmit NIP to the Conference of the Parties within two years of the date on which this Convention enters into force,
- Review and update NIP periodically according to decision of the Conference of the Parties,
- cooperate mutually in development and updating of their implementation plans directly or indirectly through global, regional and subregional organizations, and consult their national stakeholders, including women’s associations and children's health associations, ,
- endeavour to utilize and establish the means to integrate NIP POPs in their sustainable development strategies.

1.1.2 Preparation of the National Implementation Plan for the Management of Persistent Organic Pollutants

The Stockholm Convention on Persistent Organic Pollutants is an international legal mechanism aimed at reducing and preventing the use and release of persistent organic pollutants. Its primary objective is to protect human health and the environment from persistent organic pollutants. Pursuant to this Convention, all the signatory states undertook to develop a national plan of implementing the Convention. As a supporting activity, the UNEP, with the assistance of GEF, offered 12 countries a possibility to participate in the pilot project (Barbados, Bulgaria, Chile, Ecuador, Guinea Conakry, Lebanon, Malaysia, Mali, Micronesia, Papua New Guinea, Slovenia, and Zambia) for preparing the implementation plans in their countries in line with UNEP recommendations. The preparations of the national implementation plan for persistent organic pollutants were held in five stages:

1. setting up of a coordination committee and a plan for organizing the project work,
2. preparation of a review (inventory) of POP substances and the possibility of their management in the country,
3. preparation of priority list of activities and objectives of the programme,
4. elaboration of the National Implementation Plan (NIP),
5. NIP confirmation and submission of the Secretariat of SC and the European Commission.

The National Chemicals Office at the Ministry of Health obtained the amount of USD 190,000 under the UNEP tender and initiated the preparation of the implementation plan in 2003.

The public was informed of the launched project and its objectives at the introductory workshop in April 2003 in Ljubljana, and of its results at the final workshop in Ljubljana in December 2005.

The 12-member National Coordination Committee (NCC) responsible for developing the national implementation plan included the following representatives:

1. Maja Bavdaž Solce (IPEN, DEA Klub)
2. Žiga Bolta (independent consultant, Project Coordinator until October 2004)
3. Marjana Dermelj (Umanotera)
4. Ana Gregorčič (Agricultural Institute of Slovenia, Head of the Working Group on POP pesticides)
5. Albin Keuc (Head of the working group on information exchange and strengthening the institutional capacity)
6. Slavko Lapajne (Health Protection Institute Maribor, Head of the working group on monitoring)
7. Hermina Leskovšek Šefman (Head of the PCBs Working Group and Project Coordinator from February to June 2005)
8. Andrej Perc (E-NET ENVIRONMENT, d.o.o.)
9. Svetozar Polič (»Jožef Stefan« Institute)
10. Bojan Rode (Environmental Agency of the RS, Ministry of the Environment and Spatial Planning)
11. Vesna Ternifi (National Chemicals Office, Ministry of Health)
12. Ernest Vončina (Health Protection Institute Maribor, Head of the Working Group on unintentionally produced POP substances).

The NCC has adopted a detailed work plan for the NIP development. Its task was to supervise the work on preparing the NIP and ensure coordination between the sectors and the stakeholders in developing the NIP. As regards the substantive requirements of the project, five working groups were set up that each dealing with their respective areas of expertise: PCBs, POP pesticides, unintentionally produced POP substances, monitoring, exchange of information and institutional strengthening. Duties of the members of working groups included collection and compilation of information on POP substances in Slovenia in terms of intentional and unintentional use, their occurrence in the environment, foodstuff, living beings, and the activities of the management and research. Based on this information, the priority lists and the national plan proposal were drafted.

Setting up the inventory of PPP containing POP substances was hindered by incomplete information on the quantity of PPP used in Slovenia. The PPP with POP substances were used in the common state Yugoslavia, therefore individual republics do not have separate data on their usage. When an independent Slovenian state was created (in 1991), some substances were still in the register, but not in use. The amounts of the PPP used were estimated on the basis of farming practices in Slovenia. Since the quantity of old stockpiles was not known, the project initiated an extensive campaign of checking the inventory at PPP sellers and final consumers. The task was successfully carried out in cooperation with the Agency for Agricultural Markets and Rural Development and the Chamber of Agriculture and Forestry of Slovenia. The reported quantities, although small, will be verified, collected and safely disposed of within the activities envisaged in the Action Plan. Unfortunately, the number of illegal dumps in Slovenia and the information on waste deposited there is not known, therefore this task is included in the action plan.

With regard to all POP substances, we noted lack of data on the exposure of children or nursing mothers in Slovenia. Limited data from the Semič area which was contaminated with PCB, did not allow detailed conclusions on the health situation or an assessment of the impact of POP substances on the social-economic status. Regular monitoring of the values of dioxins and PCBs in the food of animal origin shows no deviations from the values, typical for the Central European region. Considering the eating habits of the population in Slovenia and the origin of food (which represents the bulk of POP substances entering the body), similar exposure to POP substances can be assumed. If Slovenia wants to become equal partner in the programmes of reducing these substances in the environment and the food chain, and protecting the most vulnerable population – the children, a concrete assessment of the situation in Slovenia has to be made, with a focus on nursing mothers. The Action Plan has envisaged a comprehensive study for the entire Slovenian territory.

The preparation of NIP involved experts and representatives of state administration and the NGOs listed in the alphabetical order below:

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1.2 Stockholm Convention

By signing the Stockholm Convention on Persistent Organic Pollutants (hereinafter referred to as SC) on 22 May 2001, the Republic of Slovenia committed itself to eliminate or restrict the production and use of twelve persistent organic chemicals. The lists of those intentionally produced substances are in Annexes A and B, while

Annex C lists the unintentionally produced substances released into the environment as pollutants during incineration or technological procedures. The overview of substances covered by the SC is given in Tables 1-3.

The basic information on the POP substances covered by the implementation plan is given in Annexes A, B and C of the Stockholm Convention.

The past use of POPs substances in Slovenia is shown in Table 1.

Table 1: Overview of POP substances in Slovenia for the period 1957 − 1991

Production and use of organochlorinated pesticides in the RS and the SFRY				
Substance/compound	**CAS No.**	**Production**	**Use**	**Source**
Aldrin	309-00-20	Yes 1959 -1976	Yes 1957-1976	Production in RS, Pinus Rače Total use in SFRY
DDT and metabolites	50-29-3	No	Yes 1957-1971	Total use in SFRY
Dieldrin	60-57-1	Yes 1959 -1966	Yes 1957-1971	Production in RS, Pinus Rače Total use in SFRY
Endrin	72-20-8	Yes 1959 -1984	Yes 1957-1988	Production in RS, Pinus Rače Total use in SFRY
Heptachlor	76-44-8	No	Yes 1966-1973	Used in SFRY, not in RS
Hexachlorobenzene	118-74-1	No	Yes 1962-1980	Total use in SFRY
Mirex	2385-85-5	No	No	Never in trade or use in SFRY
Chlordane	57-74-9	No	Yes 1962-1971	Total use in SFRY
Toxaphene	800-35-1	No	Yes 1957-1982	Total use in SFRY
Production and use of industrial chemicals				
Polychlorinated biphenyls		No	Yes 1962-1984	Use in RS; manufactured by ISKRA, Semič
Hexachlorobenzene	118-74-1	No	No	

Categories of the main sources of POPs emissions into the environment

The main sources of unintentionally produced emissions of individual POPs into the environment in Slovenia are stated by categories in section 2.3.3.4. Emissions are calculated for the period from 1990 to 2006.

2 GENERAL INFORMATION ON SLOVENIA

2.1 Facts and figures on Slovenia

Official name:	Republic of Slovenia
Population:	1,996,433 (31 December 2003)
Area:	20,273 km^2
Capital:	Ljubljana (330,000 inhabitants)
Border countries:	Austria (border length 330 km), Italy (280 km), Hungary (102 km), and Croatia (670 km)
Climate:	Alpine, Pannonian, Mediterranean
Average temperatures:	July 21°C, January 0°C
Currency:	Euro; 1 EUR = 239.64 SIT
GDP per capita:	12,979 EUR (2004)

2.1.1 Geography and population

Slovenia lies at the crossroads of the Alps, the Dinaric Arc, the Mediterranean area, and the Pannonian plain. The land is characterised by diverse relief, relative scarcity of flat world, richness of surface and ground waters, littoral position, biodiversity, landscape diversity, and extensive forest cover (56%). The total length of watercourses, rivers, permanent and torrential tributaries is 26,989 km.

The Slovenian share in the total EU territory is around 0.5%, with a similar population proportion. It is the fourth smallest country in the European Union, characterized by many scattered settlements and small villages. Almost half of the two million population lives in urban centres. The capital of the country, Ljubljana, has around 330,000 inhabitants and is the largest city. The average density is 98 inhabitants per square kilometer.

The ethnic structure: 83.06% are Slovenes (2002). Other ethnic communities are the Italian in the coastal zone and the Hungarian in the north-eastern part. They are considered as indigenous minorities whose rights are protected by the Constitution. Other ethnic groups include Croatians, Serbs, Bosnians, Yugoslavs, Macedonians, Montenegrins and Albanians. Members of the Roma community also live in Slovenia.

The key feature of demographic trends in Slovenia is very low birth rate. According to the WHO standards, in 1997 Slovenia reached the expected life-span (at least 75 years), which was 71.37 years for men and 78.75 years for women in 1999. Slovenia had a negative birth rate for the first time in 1993. Equal access to health care is ensured through community medical centres as main providers of the primary health care. In average, the public health in Slovenia has improved in the last few decades. At the same time, increased differences in the health situation have been noted in comparing regions, social groups, sexes, and among young people.

2.1.2 Political and economic profile

Slovenia is a Central-European State. It is a democratic republic, based on the principle of the separation of legislative, executive and judicial powers. The Slovenian

Constitution was adopted on 23 December 1991. It safeguards the parliamentary system of governance. It is the supreme law, adopted and amended by the National Assembly with a special procedure (a two-thirds majority). Other acts, listed in hierarchical order, include: laws adopted by the National Assembly, decrees, government ordinances for the implementation of laws, regulations, guidelines and orders of ministries for the implementation of the laws and government ordinances, and regulations of local communities adopted for regulating the issues within their competence. The National Assembly (90 deputies), the highest legislative body, adopts laws and confirms the government - the executive power which reports to the National Assembly. It is composed of a Prime Minister and ministers. The President of the Republic represents the Republic of Slovenia and is the supreme commander of armed forces. S/he is elected at direct elections for a maximum of two five-year periods.

The economic development is not the same in all Slovenian regions. The central part of the country, the area around the capital, is growing at a much faster rate than other parts. The south-eastern part of the country is the most undeveloped. The central and the coastal-Karst region developed a strong tertiary economy, while Carinthia, Zasavje and the south-eastern part of the country are more industrialised. A relatively large share of agriculture is typical in Pomurska, Notranjsko-kraška and Spodnje-posavska region, and in the south-eastern Slovenia.

2.1.3 Profile of the economic sector

The economy of Slovenia relies on the following industries: metal, wood and wood-processing industry, and construction. With EUR 12,273 GDP per capita, the RS holds the 21st place among the European countries.

Two fundamental plans have been prepared for the Slovenian economy: the Strategy for the development of the Slovenian economy, and the Operational plan of the Ministry of Economy to implement the policy of development of the corporate sector and competitiveness. The two together envisage measures and activities to achieve the fundamental long-term objectives of accelerated economic growth and increased competitiveness of the enterprises and the State.

As regards the agricultural conditions, Slovenia is characterised by a large forest cover, unfavourable relief and a high proportion of grassland. A little less than 40% of the land is reserved for agricultural production. Less than one quarter of all agricultural land lies in the lowlands. Other agricultural land scattered in the hilly, mountain, limestone and other less-favoured areas. Slovenia is on the bottom of the European scale with 0.09 ha of agricultural land per capita.

Within the Slovenian economy, agriculture accounts for about 5% GDP and employs less than 10% of the total working force. Nevertheless, the activity has an important strategic role in terms of maintaining the economic and social balance. The land ownership structure is fragmented: an average farm has about 4 hectares and low productivity despite excessive mechanization. More than 90% of agriculture is in private hands. Most farmers (about 80%) do not dependent solely on farming, but run supplementary business. Agricultural activity is often performed only to cover the farmers' own needs. Slovenia is a net importer of food and agricultural products. In

1995, foreign trade in agricultural and agri-food products accounted for 4% of the total exports, or 8.4% of the total imports of Slovenia. The most important agricultural sector in Slovenia is livestock production representing more than half of the gross value of agricultural output, followed by arable farming with 40 percent share, while fruit and wine growing together account for just over 6% share of production. The average coverage of imports to exports is low, only 41%. Slovenia covers almost 100% of its demand for potatoes, eggs, milk and milk products, fruit and wine.

In terms of energy efficiency and intensity, Slovenia is approaching other members of the EU. In case of energy intensity, Slovenia's lagging behind is approximately twice as large, and in the case of energy efficiency it was only 5% in 2000.

Compared to other Central and Eastern European countries, the Slovenian science and research activity is relatively well developed. As regards the number of scientific publications per 100,000 inhabitants, Slovenia is very close to the average of the OECD countries and the developed EU member states. The State provided stable funding of research activities in the public research institutions and universities. Moreover, scientific and R&D activities typically focus on basic research but not enough on applied research. Emergence of new, high-tech enterprises, particularly in the processing industry, is much lower than in developed countries.

2.1.4 Overview of the environmental situation

The situation of individual environment elements has stabilized after deterioration in the period of a fast industrialization and urbanization following World War II. The quality of surface water and air partly improved when Slovenia became independent, but the quality of some ground waters is getting worse. The quality level of the groundwater, as an available source of drinking water, shows a general downward trend. Better quality of the surface water mostly resulted from reduced scope of industrial production (the closure of some major pollutants). The industrial pollution affects all areas of environmental protection. In line with the IPPC Directive and the Slovenian legislation, facilities of large industrial installations will require a special single environmental permit.

The review of hazardous substances discharge into water shows no significant emissions of substances from point sources into the aquatic environment (in 2000, the total annual amount from all point sources together was 0.7 kg mercury and 14 kg cadmium). The largest share of heavy metals in the water comes from the plants for manufacturing metals and metal products; followed by the plants for manufacturing chemicals and chemical products, synthetic fibres and leather, footwear and leather goods.

Systematic surveys of soil contamination have been carried out in the areas covering about 13% of the territory of Slovenia. The levels of heavy metals (zinc, cadmium, lead) are exceeded at locations around industrial centres (in the area of Celje, individual locations around Maribor and Jesenice, in the upper Mežiška Valley, Trbovlje and Šaleška Valley). Concentrations of most organic hazardous substances detected in the soil are low.

Improved air quality is the result of a fast shift towards more environmentally friendly fuels and heating systems, and the projects of desulphurisation in thermal plants. The largest share of emissions in industry is the production of electricity and heat, followed by transport. Equally important is a long-range transmission of contaminated substances into air. The upward trend in greenhouse gas emissions was slightly halted in the last few years. Actions to reduce GHG emissions are defined in a special operational programme. Slovenia does not produce ozone-depleting substances.

The most critical was the contamination of groundwater by PPP, particularly atrazine and its metabolites desetilatrazine, and nitrates. In 2000, the recommended atrazine values (0.1 mg/l) were most frequently exceeded. One of the reasons for health inadequacy of drinking water was exceeded concentration of nitrates, particularly in the agricultural areas where groundwater is used as a source of drinking water.

The problem of municipal and industrial waste management remains unresolved. The annual production of waste in Slovenia is 873 kg per capita, or around 1.7 million tonnes in total. The amount of hazardous waste is increasing. 19 landfills of non-hazardous industrial waste are active, and one with hazardous waste. In addition to active sites, there is a number of abandoned landfills resulting from improper disposal of industrial waste, for example deposit of by-product in oil processing (gudron) near Maribor, and industrial waste deposit Globovnik near Ilirska Bistrica. This old burdens require special technical solutions and great investments; their rehabilitation is envisaged in the strategic guidelines for waste management. Slovenia has two waste incineration plants and three co-incineration plants. Around 90 m^3 of spent fuel from the nuclear power plant is generated annually. In the absence of permanent disposal of radioactive waste, all the radioactive waste and spent fuel are currently stored within the Nuclear Power Plant Krško, or in the Central interim storage of radwaste.

As regards collecting, draining and treating the urban wastewater, intense application of the Urban Wastewater Directive is underway, with a transitional period granted until 2014 for part the obligations of building sewage systems and treatment plants. The building of water purification plants is done according to plan. The objectives are set in the regulations and the operational programme.

By its biodiversity, Slovenia is one of the leading countries in Europe. Some 850 species of narrow endemic species live in its territory. The habitat types with a great number of species which are endangered because this habitat type is disappearing, mainly include dry and wet grasslands, littoral and marine habitat types, standing and running waters. Monitoring the transmission of nutrient salts of nitrogen, phosphorus and some other pollutants from land into the sea show that the interior of the Gulf of Koper is most heavily loaded.

So far, Slovenia has not managed to put under control the risks for biodiversity, landscape diversity, and the elements of non-living nature. Environmental problems have traditionally enjoyed special attention of the general public. Slovenia was the first among the Eastern and Central European countries to set up an environmental fund. Thus collected funds were used in line with a special programme adopted by the then Assembly of the Republic of Slovenia. It already contained some elements of the national programme, which are still topical. Protected areas account for about

10.7% of the Slovenian territory. Like in the rest of the world, the protected areas in Slovenia are of the utmost importance as broad ecosystems. Above all, they support the sustainable management of natural resources, thus becoming a strong opportunity for the basic development interests of the local population.

2.2 Institutional, political and legal framework

2.2.1 Programme guidelines and fundamental legislation

2.2.1.1 Regulation on Persistent Organic Pollutants

The Regulation on Persistent Organic Pollutants entered into force on 20 May 2004. Its full implementation was ensured by the Regulation Implementing the European Parliament and Council Directive 850/2004/EC on persistent organic pollutants. It combines the Stockholm Convention and the Protocol on Persistent Organic Pollutants to the Convention on Long-Range Transboundary Air Pollution.

Its main objective is to protect human health and the environment from persistent organic pollutants. Since the measures in the regulation originate in precautionary principles of the Community Treaty and the 15th principle of the Rio Declaration, and considering the option of eliminating the POPs release into the environment, stricter control measures were put in place in certain cases than those mentioned in the Convention and the Protocol.

2.2.1.2 The competence in the field of persistent organic pollutants in the Republic of Slovenia

The implementation of the Regulation on Persistent Organic Pollutants is under the responsibility of the ministries of Health and of the Environment and Spatial Planning.

National Chemicals Office at the Ministry of Health performs the following tasks:
1. issues approvals concerning exceptions,
2. prepares and submits to the Commission the required reports, information and data,
3. cooperates with the administrative and professional bodies and institutions in the Republic of Slovenia and other countries, and international organizations,
4. prepares the action plan for dealing with persistent organic pollutants.

Based on this Regulation, the Inspection of Chemicals exercises the following powers:
1. prohibits the production, trade and use of substances, whether on their own, in preparations or as constituents of articles listed in Annex I,
2. limits the production, trade and use of substances, whether on their own, in preparations or as constituents of articles listed in Annex II,
3. prohibits the use of stockpiles unless it is managed in the ways prescribed in Article 5 of the Regulation 850/2004/EC,

4. reviews the reports and information concerning the stockpile features and size, where stockpile is heavier than 50 kg and is either made up of substances listed in Annex I or II, or contains these permitted substances, and if the stockpile is located in the territory of the Republic Slovenia.

The Ministry of the Environment and Spatial Planning performs tasks in the areas of waste management and discharges into the environment. Within these tasks it:

a) prepares and submits to the Commission the required reports, information and data,
b) cooperates with the administrative and professional bodies and institutions in the Republic of Slovenia and other countries and international organizations,
c) prepares action plan for the management of persistent organic pollutants.

Based on this Regulation, the Inspection of the Environment and Spatial Planning exercises the following powers:

1. prohibits the management of stockpiles unless it complies with the manner prescribed in Article 7 of the Regulation 850/2004/EC,
2. prohibits the disposal or processing of waste containing the substances listed in Annex IV that may lead to its recycling, recovery, reclamation or re-use.

Table 2: Tasks pursuant to Regulation 850/2004/EC on POPs

Programmes / plans	**Goals**	**Convention or EU directive**
Operational Programme of banning or restricting manufacture, trade and use, and of reducing POP emissions, and measures related to waste containing such substances.	- Prohibition of production, placing on the market and use of substances listed in Annex I (on their own, in preparations or as constituents of products) - Restriction of production, placing on the market and use of substances listed in Annex II (on their own, in preparations or as constituents of products) - Setting up controls on the use and management of declared stockpiles (> 100 kg) and waste (Annex IV) - Inventory and control of release of D/F, HCB, PAH and PCB during incineration.	**SC and POPs Protocol to the CLTRAP Convention** **Regulation on persistent organic pollutants**

Table 3: Obligations pursuant to Regulation 850/2004/EC on POPs

Regulation 850/2004/EC	**Obligation and description of the requirement**	**Priority**
Articles 3 and 4	The production, placing on the market and use of substances listed in Annex I, whether on their own, in preparations or as constituents of articles, shall be prohibited. The production, placing on the market and use of substances listed in Annex II, whether on their own, in preparations or as constituents of articles, shall be limited. Prohibitions and restrictions shall not apply in the case of a substance used for laboratory-scale research or as a reference standard, and a substance occurring as an unintentional product.	Six months after the date of entry into force of the Regulation.
Article 6 Measures for reduction or elimination of POP release	Member States shall draw up and maintain release inventories for the substances listed in Annex III into air, water and land.	Within two years of the date of entry into force of this Regulation

Article 12(1)	Member States shall every 3 years forward to the Commission information on the application of this Regulation, including information on infringements and penalties.	Every three years
Article 12(2)	Member States shall provide the Commission every year with statistical data on the actual or estimated total production and placing on the market of any substance listed in Annex I or II.	Each year
Article 12(3)	Member States shall provide the Commission with reports and summary information on the presence of dioxins, furans and PCBs as identified in Annex III.	Within 3 years of the date of entry into force of this Regulation (by 20 May 2007) and every 3 years thereafter
Article 13 Penalties	Member States shall lay down the rules on penalties applicable to infringements of this Regulation. The penalties provided for must be effective, proportionate and dissuasive.	Within one year of the date of entry into force of this Regulation
Article 15	Each Member State shall designate the competent authority responsible for the administrative tasks required by this Regulation.	Within 3 months of the date of entry into force of this Regulation

Application of Regulation 1881/2006 setting maximum levels for certain contaminants in foodstuffs which may include POPs substances, and Recommendation (2006/794) on the monitoring of background levels of dioxins, dioxin-like PCBs and non-dioxin-like PCBs in foodstuffs, is the responsibility of the Ministry of Health and the Ministry of Agriculture, Forestry and Food.

2.2.1.3. The role and responsibility of the ministries, agencies and other government institutions in managing POPs

In the field of environmental protection and human health, the Regulation on the bodies within ministries (Official Gazette of RS, Nos. 18/03, 45/04, 138/04, 52/05) defines the role and the responsibilities of the following ministries:

2.2.1.3.1 The Ministry of Health

The Ministry of Health (MZ) primarily performs tasks related to:

- healthcare activities and health insurance,
- health measures to be taken in the event of natural and other disasters,
- protection of the population against addiction-related health problems,
- food safety and the nutritional quality and hygiene of food and drinking water with a view of preventing chemical, biological and radiological pollution and conducting a general policy on nutrition,
- the production of, trade in and supply of medicines and medicinal products,
- the production of and trade in chemicals and drugs,
- the safety of products intended for general use,
- health and ecological issues relating to the environment, where a direct impact on human beings is involved,
- waste management from the health protection aspect.

Bodies within the Ministry of Health include:

– The Slovenian Radiation Protection Administration
– National Chemicals Office of the Republic of Slovenia
– Health Inspectorate of the Republic of Slovenia

National Chemicals Office of the Republic of Slovenia (URSK)

The Office was established on 29 August 1999 based on the Chemicals Act. It performs tasks related to the preparation and application of regulations governing chemicals, maintenance of lists and exchange of information on chemicals, placing biocides on the market, classification, packaging and labelling of chemicals, and the conditions and measures for their proper management, participation in the procedure of issuing permits for plant protection products, implementation of the Convention on Persistent Organic Pollutants, coordination of good laboratory practice, coordination of the Intersectoral Committee for Chemical Safety, biomonitoring of chemicals, implementation and monitoring of the application of legislation on precursors for illicit drugs and chemical weapons.

Chemicals Inspection

Chemicals Inspection performs the duties of inspection over the application of regulations and general acts within the jurisdiction of URSK.

Health Inspectorate of the Republic of Slovenia (ZIRS)

In the context of protecting public health, the Health Inspectorate monitors the implementation of laws and other regulations governing the following fields:
- communicable diseases;
- wholesomeness and safety of food;
- safety of drinking water and facilities for the public supply of drinking water;
- products and substances coming into contact with food;
- minimum sanitary standards;
- management of waste generated in the performance of medical activities in the facilities used for these activities.

2.2.1.3.2 The Ministry of Environment and Spatial Planning

The Ministry of Environment and Spatial Planning (MOP) safeguards a healthy living environment, promotes and coordinates efforts toward sustainable development based on wise and efficient use of natural resources. MOP ensures the conditions for equal cooperation with the European Union in the fields of infrastructural integration and environmental standards and rules. It seeks to increase the society's concern for maintaining ecological balance and biodiversity, and leads the spatial development. It ensures the maintenance of water supplies, the quality of water and sustainable regulation of surface waters, ground waters and the sea. It also ensures that environmental costs are included in economic ones at the corporate level and in the national economy.

Bodies within the Ministry of Health include:
- Environmental Agency of the RS,
- Surveying and Mapping Authority of the Republic of Slovenia,

- Nuclear Safety Administration of the Republic of Slovenia,
- Inspectorate of the RS for the Environment and Spatial Planning.

Environmental Agency of the Republic of Slovenia (ARSO) performs expert and administrative tasks of integrated protection of the environment, natural resources, water, air and soil, environmental impact assessment, public services protecting the environment and natural resources, protection against noise and other environmental threats, nature conservation, management of water and water facilities and installations, monitoring and other types of recording meteorological, hydrological and ecological conditions through relevant analyses and expertise; monitoring and other surveillance of geological, seismic and other geophysical events, their categorisation and classification; systems of safety, protection and early warning against seismic events, (non-radioactive) waste management and elimination of the consequences of natural and other disasters.

Inspectorate of the RS for the Environment and Spatial Planning performs tasks of supervising the implementation of regulations and general acts governing the protection of the environment and nature; ecological monitoring at the state border, inspection of water regime; regulation of waters and water management, exploration and research of mineral resources; rational energy consumption, urban planning, construction of facilities and elaboration of structures; meeting essential requirements for facilities; the housing, surveying and mapping activities.

2.2.1.3.3 The Ministry of Agriculture, Forestry and Food

The Ministry of Agriculture, Forestry and Food *(*MKGP*)* is responsible for a broad area of work related to agriculture, forestry and food, supplementary farming activities, veterinary medicine, hunting, fishing, and other related areas. The ministry has four constituent bodies operating in specialized fields:
- Phytosanitary Administration of the Republic of Slovenia (FURS),
- Veterinary Administration of the Republic of Slovenia (VURS),
- Inspectorate of the Republic of Slovenia for Agriculture, Forestry and Food (IRSKGH),
- Agency of the RS for Agricultural Markets and Rural Development.

Phytosanitary Administration of the RS is the authority responsible for registration, trade and use of plant protection products, and for drafting the relevant legislation. In addition, it provides for the protection of plants against pests, and the implementation of other relevant measures ensuring the production of safe food and the protection of the environment. In the field of seed production, it is responsible for the production and marketing of healthy and quality seeds and seedlings of the varieties which can be cultivated in Slovenia, and for the protection of rights for new varieties.

Veterinary Administration of the RS performs administrative, technical and inspection tasks within the veterinary field.

Inspectorate of the RS for Agriculture, Hunting and Food is responsible for supervising the implementation of regulations within the competency of the MAFF.

Agency of the RS for Agricultural Markets and Rural Development was established for the implementation of the Special Accession Programme of Agriculture and Rural Development - SAPARD, the implementation of the Slovenian agricultural reform, and harmonisation with the Common Agricultural Policy of the EU. It basically performs tasks defined in the Agriculture Act.

2.2.2 International commitments

On 1 May 2004, the Republic of Slovenia became member of the European Union and assumed the right of co-creating the European legislation and policies. Members of the Slovenian government daily attend the meetings of the EU Council working bodies, representing the interests of Slovenia following the previously coordinated inter-ministerial positions in the process of elaborating and adopting the decisions and acts of the EU.

Based on the strategic documents of the European Commission and the Council, the Government each year prepares and adopts priorities for the work of Slovenia in the EU Council.

In line with the above mentioned national reasons and international recommendations, and determined to establish a closer cooperation among different actors, the Government set up a Commission for the first time in 1996, now called the Intersectoral Committee for Chemical Safety (MKKV). Its members come from the competent government bodies and the interested non-government sector involved in any phase of the chemicals' life cycle.

The Republic of Slovenia is member of several international organizations, e.g. OECD, UN, UNEP, or cooperates with them. It is party to numerous international treaties, conventions and protocols. International environmental conventions and protocols associated with POPs substances are presented below.

2.2.2.1 International environmental conventions

International environmental conventions ratified by Slovenia which are directly or indirectly associated with the implementation of the SC are given below.

Basel Convention on the control of transboundary movements of hazardous wastes and their disposal

BC is an international mechanism for controlling transboundary movement or international "traffic" of hazardous waste. The basic purpose of the Convention is to restrict trade with hazardous waste and prevent its export to undeveloped or less developed countries under the guise of "recycling". Each Member shall undertake to reduce the amount of produced waste at the source. To the extent of the possible, adequate disposal facilities shall be available for removing such waste. Environmentally sound management of this waste should be ensured, and before the transboundary movement of hazardous waste, consent has to be obtained by the competent bodies of all the countries concerned (including the transitory ones). BC provides control of the following types of waste:

Y10 Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs).
Y43 Any congenor of polychlorinated dibenzo-furan.
Y44 Any congenor of polychlorinated dibenzo-p-dioxin.

It also provides for control over the substances with the following characteristics:
H11 Toxic (delayed or chronic) Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity.
H12 Ecotoxic substances or waste time when they are bulky and cause or may cause immediate or delayed adverse impacts on the environment due to bioaccumulation and / or toxic effects on living systems.

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

Rotterdam Convention on the prior informed consent procedure (PIC) for certain hazardous chemicals and pesticides in international trade defines the consent procedure based on prior information. The procedure for obtaining consent is the procedure where the chemicals that are banned or restricted in the exporting country may be exported to the importing country only upon prior notification. Chemicals that are on the PIC list may be exported only upon consent of the importing country. If the importing country does not agree with the import, it must act accordingly in its own country and comply with this decision.

The RC equally stipulates that each Party shall ensure, to the extent practicable, 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 than the chemicals listed in Annex III.

When exporting, each Party shall require that chemicals listed in Annex III, chemicals banned or severely restricted in its territory, and chemicals subject to environmental or health labelling requirements 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, taking into account relevant international standards.

Parties to the Rotterdam Convention shall also ensure public access to information on their final national measures prohibiting or strictly restricting the chemicals which are of relevance for achieving the goals of Convention.

Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters

The AC which the Republic of Slovenia signed in 1998, governs the issues of access to information, public participation in decision-making, and access to justice in environmental cases. It establishes minimum standards to be achieved and maintained by the parties but does not restrict the existing rights or prevent any Party from adopting measures which go beyond these minimum standards.

One of the key elements of the AC is a clear provision that information on emissions held by national authorities may not and can not be declared secret or confidential.
In association with SC, the AC lists in Annex I the activities requiring the "environmental license", largely covered by the provisions of IPPC guidelines and regulations on the environment impact assessment. Thus, providing that the public must be adequately, timely and efficiently informed on the initiated procedure, the possibilities of public participation, on the time and place of public hearing, where to find additional information, which authority receives comments or questions, and what environmental information is available in connection with the proposed activity.

In the field of cooperation, the Convention requires in particular public participation in decisions on interventions in the environment (the procedure of environmental impact assessment), and public participation in adopting plans, programmes and policies connected with the environment (the procedure of integral or strategic impact assessment on environment).

Barcelona Convention for the Protection of the Mediterranean Sea against Pollution

Slovenia ratified the revised Barcelona Convention in 2002. Parties to the Convention are committed to take all appropriate measures to prevent, abate and to the widest extent possible eliminate and combat pollution of the Mediterranean Sea area, and to protect and enhance the marine environment of that area, thus contributing to its sustainable development.

In order to protect the environment and contribute to the sustainable development of the Mediterranean Sea Area, the Contracting Parties shall:

a) apply, in line with their capabilities, the precautionary principle, by virtue of which where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation;
b) 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, with due regard to the public interest;
c) undertake environmental impact assessment for proposed activities that are likely to cause a significant adverse impact on the marine environment and are subject to an authorization by competent national authorities;
d) promote cooperation between and among States in environmental impact assessment procedures related to activities under their jurisdiction or control which are likely to have a significant adverse effect on the marine environment of other States or areas beyond the limits of national jurisdiction, on the basis of notification, exchange of information and consultation;
e) commit to promote the integrated management of the coastal zones, taking into account the protection of areas of ecological and landscape interest and the rational use of natural resources.

The parties have also committed themselves to utilize the best available techniques (BAT) and the best environmental practices (BeP) and promote the application of, access to and transfer of environmentally sound technology, including clean

production technologies, taking into account the social, economic and technological conditions.

In the field of communication and cooperation, the Contracting Parties shall ensure that their competent authorities give to the public appropriate access to information on the environmental state in the field of application of the Convention and the Protocols, on activities or measures adversely affecting or likely to affect it and on activities carried out or measures taken in line with the Convention and the Protocols. The Contracting Parties shall also ensure that the opportunity is given to the public to participate in decision-making processes relevant to the field of application of the Convention and the Protocols, as appropriate.

For the purposes of the Convention, the Mediterranean Action Plan (the MAP) was adopted in the 70-ies, and upgraded in the 90-ies as 'Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean Sea'. The MAP especially highlighted the need to take action towards:

- Development of education and information programmes to arouse public awareness, together with initiatives aimed at special target groups,
- Promotion of speedy dissemination of available data by various means, including the media, concerning the state of habitats and populations and the threats affecting them, especially for protected species, and on the management and conservation activities and programme conducted, and
- establishment at national and/or local levels, and periodic assessment of information and awareness programmes in line with the conservation measures carried out or envisaged.

In 2003, the parties agreed that they will develop special technical guidelines for environmentally sound management of waste containing or contaminated with POPs.

2.2.2.2 International Environmental Protocols

Two Protocols to international conventions were adopted in the last decade, indirectly or directly addressing the issue of POPs. The Republic of Slovenia signed both Protocols: in 1998 the Protocol on Persistent Organic Pollutants, and in 2003, the Protocol on Pollutant Release and Transfer Registers.

Protocol on Persistent Organic Pollutants to the UN Convention on Long-Range Transboundary Air Pollution

The Republic of Slovenia ratified it in 2005. The Protocol on Persistent Organic Pollutants to the UN Convention on Long-Range Transboundary Air Pollution is one of the eight Protocols to the Convention of 1979 on Long-Range Transboundary Air Pollution.

Since 1995, the Agency has been submitting data on releases of persistent organic pollutants: HCB, PCB, PAH and PCDD/PCDF which have to be reduced according to the POPs Regulation (Annex III). ARSO is responsible for collecting data and setting up inventories of pollutant emissions into air. The Protocol on Persistent Organic Pollutants is applicable since 23 October 2003.

Protocol on Pollutant Release and Transfer Registers (RIPO) to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters

The objective of the PRTRs (RIPO) Protocol is to enhance public access to information through the establishment of coherent, integrated, nationwide pollutant release and transfer registers which could facilitate public participation in environmental decision-making as well as contribute to the prevention and reduction of pollution of the environment.

Slovenia has not yet established a register in line with the provisions of this Protocol. The Protocol itself defines the activities and pollutants which represent the minimum for the creation of the national PRTR System. The Protocol requires from each party to ensure that its register includes the information on:

- Releases of pollutants,
- Off-site transfers and releases of pollutants from diffuse sources.

The Protocol requests reporting on releases resulting from both routine activities and extraordinary events (for example, in accidents). Annex II to the Protocol provides the list of pollutants with 86 different substances and compounds.

European Pollutant Emission Register – implementation of IPPC Guidelines

In 2000, is European Commission adopted specific decisions on the establishment of a European Pollutant Emission Register or European Pollutant Emission Register (EPER). The decision stipulates that all Member States should maintain a register of emission data from specific industrial sources and report their emissions from a single source Commission.

Protocol for the Protection of the Mediterranean Sea against pollution from land-based sources and activities

It is important to mention the Protocol for the Protection of the Mediterranean Sea against pollution from land-based sources and activities which applies to:

a) discharges resulting from point- and diffuse sources and land-based activities in the territories of the parties and may directly or indirectly affect the Mediterranean Sea area,
b) entries of substances that pollute the air and are transported to the Mediterranean Sea area from land-based sources or activities on the territories of the parties under the stated conditions. These substances are taken from the Basel Convention and include PCB, PCT, PCBB, PCDD and PCDF:

2.2.3 Legislation associated with POPs

Environmental Protection Act

The Environmental Protection Act (ZVO-1, ZVO-1B) brings some new provisions in the field of industrial pollution, particularly with regard to integrated prevention and

control of pollution (IPPC), prevention of severe accidents and mitigation of their consequences.

The following requirements are particularly important with regard to POPs:
- reduction of matter and energy consumption,
- reduction of the content of hazardous and harmful substances in raw materials, semi-finished products or products,
- substitution of substances and fuels with more environmentally sound ones,
- requirements concerning the control of environmental soundness of products or technologies in import and transit, and
- other practices necessary to prevent and reduce environmental burdens.

The government will also issue various recommendations for the conduct of polluters, that will contribute in the long term to the prevention and reduction of environmental burdens. Expert Council for the promotion of environmentally-friendly production Is expected to be set up. It would primarily provide expert opinions of MOP concerning the development and implementation of the System for awarding the eco-label scheme and the implementation of the EMAS System.

The Act also provides the basis for setting up the environmental information and public participation system. One of the most important provisions (complying with the EU guidelines and the provisions of Aarhus Convention) stipulates that environmental data on emissions and waste, the list of hazardous substances and the safety report have to be made public.

In addition, the ZVO-1 Act stipulates that the State shall:
- carry out special environmental education activities and raise public awareness with regard to the environment,
- co-finance NGO programmes in the field of environmental protection, and
- finance other activities when these are provided by the State for the benefit of the public in the field of environmental protection.

The Act also introduces the environmental protection supervisory service, for the purpose of which a training programme will be organised by the Government.

Waters Act

Based on the European Water Directive, the Waters Act establishes the principles and the institutional framework for water management and planning, with a focus on public participation as a basic element of planning. It provides for the adoption of a National Water Management Programme which shall contain in particular:
- an assessment of the state of affairs in the area of water management;
- objectives and guidelines regarding the protection, regulation and sustainable use of waters;
- priorities for achieving water management objectives;
- an assessment of the funds required for implementation of the programme and the deadlines for achieving the objectives.

The Act also provides for the establishment of a National Water Council, and a special Water Conference for individual river systems.

The Chemicals Act

The Chemicals Act focuses on the assessment of chemicals, management of the chemicals information system, and the conditions for manufacture, transport, storage and use of chemicals. The Act governs classification, labelling and packaging of chemicals by their degree of risk; and the conditions, commitments and measures for proper handling with chemicals. The Act also regulates bio-monitoring of chemicals in humans and organisms.

In the event of a reasonable concern that certain chemicals may lead to serious or irreversible consequences for human health or the environment due to geographical, environmental and health features of the Slovenian area, the Government may adopt temporary restrictions or prohibitions.

The Customs Service Act

The Customs Service Act governs and defines the tasks and the organization of the Customs Service, the powers, the collection, protection and security of information, special labour relationships, specific characteristics of disciplinary liability, liability for damage, and offences. Since May 2004, the customs authorities are applying the EU Regulations and rules in carrying out their duties.

The traffic control with the goods, which could include any of the POP substances, customs authorities shall act with the established forms of control the Regulations and rules of the EU.

In inspecting the goods which could contain any of the POP substances, the customs authorities use the established forms of control:
- verification of declarations and inspection of goods upon clearance,
- subsequent control in customs offices and enterprises,
- inspections of the customs investigation service.

There are no specific rules imposing control and action of customs authorities in respect of goods that could involve POP substances. The import control of such goods and the competence of the customs authorities were abolished by the Zkem Act amended in 2003, which transferred the control directly to the market.

The inspection of the cross-border traffic is carried out with the Customs Information System, EUCIS. In managing the information on the import and export of goods, the combined nomenclature (CN) is applied and the Integrated Tariff of the Community, TARIC. Currently, the connection of the EU Member States with the TARIC server in Brussels is underway. It will allow uniform and automated electronic data exchange. Another advantage in the traffic control is the SDP (track determining) system, where data are collected systematically, and, based on risk analysis, additional checks will be carried out. POP substances do not have their own tariff code, therefore the investigation within these groups is impossible.

Veterinary Compliance Criteria Act

The Veterinary Compliance Criteria Act governs veterinary criteria compliance, traceability and certification related to animals, animal products and feed; veterinary compliance criteria and veterinary related rules on the trade and use of medicines, veterinary inspections, veterinary control; official veterinary control measures; financing of veterinary inspections and official veterinary supervisions, databases, information system and the special administrative procedure.

Based on this Act, the Veterinary Administration of the RS performs:

- annual analyses of the monitoring of residues of noxious substances in foodstuffs; preparing risk assessments for risks caused by these residues in foodstuffs, and preparing annual reports;
- implementation and organisation of the monitoring of residues in foodstuffs,
- implementation of and organising the monitoring of residues in animals and animal feed;
- participation in developing the programmes of professional education and training.

Health and Hygiene Safety of Foodstuffs and Products and Materials Coming in Contact with Foodstuffs Act

The Health and Hygiene Safety of Foodstuffs and Products and Materials Coming in Contact with Foodstuffs Act lays down the mechanisms and responsibilities for ensuring the hygiene safety of food and all other materials that come into contact with them during production, processing or treatment. The basic purpose of the Act is to provide quality control of foodstuff and reduce the possibility or likelihood of public health risks from exposure to various pollutants.

Foodstuffs should not be placed on the market if they contain contaminants or other noxious substances, or if they contain them in the amounts that may endanger health following the assessment and analysis of the risks which the pollutants or other noxious substances may represent for human health.

The Institute of Public Health of the RS and regional Health Protection Institutes play an important role by keeping databases on the scope and results of investigations during the monitoring with the aim to analyse the effects of foodstuffs, potable water and the products and substances coming into contact with foodstuffs, on the human health. The proposal of monitoring and its operators is made on the basis of findings and records on the hygiene safety of food, drinking water, conditions of production, hygienic conditions and the epidemiological situation of communicable diseases in the production or trade of food and drinking water, as well as records on diseases which are directly or indirectly linked to foodstuff, potable water or substances and products coming into contact with foodstuffs.

In addition to the Health and Hygiene Safety of Foodstuffs and Products and Materials Coming in Contact with Foodstuffs Act, Slovenia applies a number of Council, European Parliament or Commission regulations governing food safety, including contamination with POPs. Regulation (EC) No 178/2002 of the European Parliament and of the Council laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, provides a framework for ensuring a high level of human health and consumers' interests in terms of food.

The framework regulation in the field of pollutants in food is Council Regulation (EEC) No 401/93 laying down Community procedures for contaminants in food. Beside defining the pollutants and setting maximum levels for certain contaminants in food, this regulation stipulates that if a Member State, as a result of new information or of a reassessment of existing information, has reason to suspect that a contaminant in food constitutes a health risk, it may temporarily suspend or restrict application of the provisions in question in its territory.

Commission Regulation No 1881/2006 setting maximum levels for certain contaminants in foodstuffs, defines in detail, beside other pollutants, the precise maximum levels for dioxin and the sum of dioxins and dioxin-like PCBs for certain foods. Foods exceeding a certain maximum level shall not be placed on the market. According to official control of foodstuffs conducted by ZIRS (sampling and analytical methods for carrying out official controls of the values of dioxins and dioxin-like PCBs are prescribed in the Commission Regulation No 1883/2006), the maximum levels of those contaminants in foodstuffs are also checked.

The Commission also adopted Recommendation (2006/794) on the monitoring of background levels of dioxins, dioxin-like PCBs and non-dioxin-like PCBs in foodstuffs Based on data collected by all Member States, the Commission wishes to obtain a clear picture of the movement of these substances and their presence in foodstuffs.

The Act on Plant Protection Products

The Act on Plant Protection Products (PPP) regulates all the procedures connected with registration, trafficking and use of PPP, and the control over the implementation of regulations. It sets out the entire procedure of registering individual PPPs, including the assessment of risks they present for human health, animals and the environment resulting from their use under the national conditions. It also defines other licensing procedures for the placing of the PPPs on the market and their use, and the control over their trade and use.

The competent authority for registration or for the placing of PPP on the market and use, and to develop and implement by-laws is the Ministry of Agriculture, Forestry and Food (MAFF), i.e. the Phytosanitary Administration of the RS (FURS). The competent authority to exercise control over the marketing and use of PPPs is the Inspectorate of the RS for Agriculture, Forestry and Food (IRSKGH) within the same ministry. Imports of PPPs are controlled by the phytosanitary inspector who may prohibit or suspend imports, if a certain PPP is not registered in the RS, has no marketing authorization for the RS, or is not properly packed and labelled.

As regards trade in PPPs for the needs production, classification, packaging and labelling of PPP, and good laboratory practice, this Act refers to the Chemicals Act.

Agriculture Act

This Act sets out the agricultural policy objectives, the planning of agricultural and rural development, agricultural policy measures, quality and labelling of agricultural products and foodstuffs, trade in agricultural products and foodstuffs, public services, databases and information on agricultural issues, procedures and bodies responsible for the application of the Act, education, expert tasks and administrative inspection.

The objectives of agricultural policy are primarily focused on:
- the protection of agricultural land from pollution and irrational exploitation, and the
- application of the principles of environmental protection and nature conservation.

Plant Health Act

The act regulates the protection of plants, crops and plant products against harmful organisms (pests and diseases), measures to prevent the occurrence and control of harmful organisms, plant health control in the internal market, consignments of plants at import, export and transit, compensations to owners of destroyed plants, fees for

the health checks and enforcement authorities, and control of the application of law. The tasks in this field are under the responsibility of the Phytosanitary Administration of the RS, while the inspection is provided by the Phytosanitary Inspection Office.

Health and Safety at Work Act

The health and safety at work act binds the employer to ensure health and safety associated with work. To this end, the employer has to apply necessary measures to ensure the safety and health of workers, including the prevention of occupational risks, the information and training of employees with the appropriate organization and the necessary material resources.

An employer ensures health and safety at work through:
- informing employees or their representatives about the introduction of new technologies or means of work, as well as any potential or actual dangers of injury or health impairment possibly related to them, and issuing the pertaining safe working practice instructions,
- training of employees in safe working practice;
- providing employees with personal protective equipment and ensuring its use if the means of work or working environment are inadequate to ensure mandatory health and safety at work despite the safety measures being taken.

Legal and natural persons carrying out the activity of ensuring health and safety at work, the University and other institutions of education shall all take part in the planning of collective activities referred to in the preceding paragraph.

The law also stipulates that education and training concerning health and safety at work shall form an integral part of the general and vocational education received in schools of all types and levels, as well as an integral part of introduction and ongoing training of an employee at work.

2.2.4 Programming documents for plant protection products and chemicals with POPs

National Environment Protection Action Programme

The National Environment Protection Action Programme (hereinafter: NPVO) was adopted in 2005 as a basic strategic document on environmental protection with the purpose of generally improving the environment and quality of life, and protecting the natural resources. It is prepared on the basis of the ZVO Act and complies with the environmental programme of the European Union. The NPVO is setting out key environmental objectives and priorities following the assessment of the environmental situation and the prevailing trends. The basic policy focus is to ensure sustainable development using technical solutions to limit the pollution. It covers the period until the end of 2012, while individual measures are presented more precisely for the period 2005−2008. Objectives and measures are identified within four areas: climate change; nature and biodiversity; the quality of life; waste and industrial sphere.

Strategic guidelines for waste management in the Republic of Slovenia

Strategic guidelines for waste management in the Republic of Slovenia (hereinafter: SURO) were adopted by the Government in 1996, and in 1999 they were included in the NPVO. The SURO do not directly tackle the issues of POPs, but at the strategic

level relates them (notably dioxins and pesticide packaging waste) to the fifth environmental action programme of the Community.

The SURO envisages:
- Phasing out products from PVC which is one of the precursors of the generation of dioxins and furans in thermal treatment (incineration),
- Overall (integrated) work with various actors engaged in waste management,
- definition of site, quantity and structure of illegal dumps.

Operational Programme for the elimination of polychlorinated biphenyls and polychlorinated terphenyls in the period from 2003 until the end of 2006

Addressing the issue of PCB is one of the major strategic objectives for reducing the risk potential of waste at its source for the benefit of the next generations, and reducing environmental risks. By 2010, the key commitment in this field is to take care of all PCB facilities containing oils with more than 500 mg PCB/kg; and to perform decontamination of PCB contaminated equipment with oil contents in the range of 50-500 mg PC/kg, if their lifetime has not expired. A comprehensive plan for collection and disposal of equipment and devices containing less than 500 mg PCB/kg should be elaborated by the end of 2006.

Operational Programme of preventing the aquatic environment pollution with hazardous chlorinated hydrocarbons from non-point sources

The programme of preventing the pollution of aquatic environment from emissions of hazardous chlorinated hydrocarbons from non-point sources in the RS is the operational programme based on the National Environment Protection Action Programme (OG RS Nos. 83/99, 41/04). It is elaborated with the purpose of meeting the requirements of Directive 76/464/EEC on pollution caused by certain hazardous substances discharged into the aquatic environment, and Article 5 of Directive 86/280/EEC on limit values and quality objectives for discharges of certain hazardous substances. Pursuant to these Directives, EU each Member State has to adopt a programme of measures to reduce or Prevent the emissions of hazardous chlorinated hydrocarbons from non-point sources into the aquatic environment.

The programme of preventing the pollution of aquatic environment from chlorinated hydrocarbons is based on the application of the already adopted regulations on limit values of release into the environment, expressed as concentrations or emission factors for different types of industrial plants; data on identified and important point- and non-point sources of the hazardous CH emissions, data on monitoring the surface water quality, and data on the performed and the envisaged measures for reducing or eliminating the effects of hazardous CH emissions.

The programme of preventing the pollution of aquatic environment from chlorinated hydrocarbons includes 15 hazardous substances subject to the provisions of the European law (Directives 79/117/EEC and 96/597EC), which also include POPs in line with the requirements of the SC and the Protocol on POPs.

Operational Programme for the management of waste oils in the period from 2003 until the end of 2006

The purpose of the operational programme for the management of waste oils in the period 2003-2006 is remediating old burdens, upgrading the current system of waste

oil management, improvement of the existing systems of informing and reporting, and broader participation of target public. It focuses in particular on raising the awareness of all the entities involved, especially those related to households and areas where waste oils are generated because of the machinery used in agriculture and forestry. The Operational Programme provides for the measures to prevent the mixing of waste oils with other hazardous liquid waste, notably the PCB and PCT waste.

Slovenian agri-environmental programme
Although the Slovenian agricultural environment programme does not mention POPs and is only a sub-programme of the "Agricultural Policy Reform", it is designed for the agricultural restructuring aimed at reducing negative impacts of agriculture on the environment and preserving natural heritage, biodiversity, soil fertility and traditional cultural landscapes, and protecting the areas under protection.

2.3 Management of POPs substances in Slovenia

2.3.1 General legal framework and the rules on trade and use of plant protection products in Slovenia

2.3.1.1 Legal basis

By the legislation governing plant protection products, chemicals and the protection of human health, animals and the environment, as well as in all other areas, the Republic of Slovenia has adopted the *acquis communautaire*. Although the use of POPs pesticides has not been allowed for quite some time, because of their persistence they will continue to be the object of routine monitoring in terms of residues in foods, agricultural products and all the elements of the environment.

2.3.1.2 Trade and use of PPP

Only registered PPP may be in placed on the market and used in the territory of the Republic of Slovenia, or approval must be granted for their exceptional use, research and development. The procedure of registering and authorizing the plant protection products is governed by the Act on Plant Protection Products. Adequacy of each PPP is assessed by authorized evaluators. Based on their opinion, the Commission for plant protection products decides on the registration. The decision on approving or refusing the registration is issued by the Phytosanitary Administration (hereinafter: FURS) following the decision of the Commission and in agreement with URSK at the Ministry of Health. Before placing on the market, PPP must be properly classified, packed, labelled and accompanied by instructions for use in line with the regulations.

Trade in plant protection products may be pursued by legal or natural persons which are registered and based in any EU Member State. In order to be registered, they have to meet the prescribed conditions in terms of facilities, equipment and human resources, keeping the records and submitting reports on the trade in PPP.

Any natural or legal person engaged in the PPP trade must employ a person responsible for receiving, warehousing, storing and issuing PPPs, keeping records,

including the supervision and training of other employees who issue the PPP. They also have to provide the instructions for using the PPP in retail shops. The responsible person must have at least higher education in agriculture, major in plant protection. PPPs may also be issued by employees who completed a minimum four-year agricultural secondary school (plant protection). Both the responsible person and the employees must, in addition to appropriate education, complete additional course and pass a phytomedical exam, or possess a valid certificate on the exam.

The act on plant protection products also defines their proper use and the conditions to be met by the PPP operators or users. The Rules on the responsibilities of users of plant protection products set out, *inter alia*, mandatory additional training of users, keeping the records on the use of PPPs and application devices. The latter must be certified and tested regularly, every second year.

The waste management plan, initiated under the new legislation by the Agency for Agricultural Markets and Rural Development in 2005, takes into account for the first time hazardous waste on the farms (waste oils, batteries, pesticides, PPP and their packaging, and partly animal carcasses) in assessing environmental impact for the needs of subsidizing investments in agricultural holdings. The assessment is based on the following information:

- where and how the waste is generated
- the existing and the anticipated waste management methods,
- disposal of waste generated.

The entire plan will be set up for the duration of investment, i.e. one to two years, and extended to five years after the completed investment (5 to 7 years in total).

2.3.1.3 Education

The Rules on professional training and assessment of knowledge in phytomedicine prescribe mandatory professional training of responsible persons, agents and operators of plant health measures.

Education is organised in the form of 15 hour- seminars for operators, 20 hours for retailers, and 35 hours for the responsible persons. After the training, the participants take an exam and receive certificates or cards with a validity of 3 to 5 years.

2.3.1.4 Records on the trade and use of PPP

Any operators involved in placing the PPPs on the market must keep annual records of the PPP quantities purchased abroad and in the RS, the quantities of PPP on the market and in warehouses, and the quantities of PPP which were withdrawn from the market. The responsible person keeps annual inventory of the PPP trade separately for the wholesale and the retail. All data must be supplied to FURS on a single form electronically, no later than on 31 March for the previous year.

The Rules governing the duties of operators provides for mandatory record keeping of PPP. The duty applies to all commercial producers of plants for human or animal consumption, to market growers of ornamental plants, to natural or legal persons performing pest control in non-agricultural land (rail facilities, airports, highways, parks, cemeteries, industrial yards, etc..), and those who provide or disinfect the propagating materials. The records are held by the users of PPP and kept by the

owners or managers of the holdings, land, or other facility. The records must be accessible at all times to agricultural inspectors in charge of monitoring the proper use of PPPs.

2.3.1.5 Prohibitions on the trade and use of PPP containing POPs

Prohibition and restriction on trade and use of certain active substances which are used as PPP are defined in detail by the Rules on the prohibition of marketing and/or use of plant protection products containing certain active substances. In addition to these rules, the use of various PPP can be further prohibited or restricted in certain areas due to exceeded amounts of residues of active substances in groundwater.

2.3.1.6 Control of the trade and use of plant protection products

When Slovenia joined the European Union, the scope of its market has changed, as it became the internal market on the entire EU territory. The international trade is therefore not carried out in terms of import/export, but entry/exit of goods passing among the European Union countries. In cases of PPP trade with other EU Member States, the border controls do not exist. After dropping the control on the borders with the neighbouring EU countries, it was transferred to the interior of the country and is carried out by agricultural inspectors. However, when imports are made from third countries into the EU customs territory, the phytosanitary inspector performs border controls. PPP can be brought to the EU customs territory across the Republic of Slovenia only through the points of entry specified in the Order on the designation of border crossing points for marketing plant protection products and inspection procedures for their import.

Inspection and control of the trade and use of PPPs inside the country is carried out by the RS Inspectorate for Agriculture, Forestry and Food (IRSKGH). Agricultural inspectors supervise the inland circulation of PPPs, registration, labelling, instructions for use, the composition of plant protection products, and their use. In addition, agricultural inspectors supervise the legal and natural persons engaged in trade with the PPP: entry into the register of shops, compliance with the requirements on human resources, keeping the records, etc. If a legal or natural person does not meet the prescribed conditions, the inspector may prohibit the activity of trade in PPP until the deficiencies have been eliminated. The agricultural inspector executes his or her responsibilities under the ZFfS Act and the corresponding regulations.

Agricultural inspectors also review the qualifications of PPP operators and keeping of records on their application. Proper use of PPP is also controlled indirectly, by checking if producers respect the prescribed limit values of residues in their products.

Monitoring of compliance with specific sanitary and technical conditions concerning the premises where the PPP trade and storage take place is performed by inspectors for chemicals. Before the entry in the stores register, the inspector verifies the compliance with the requirements concerning the premises or equipment of legal and natural persons engaged in trade with PPP. Monitoring has been successfully carried out throughout the period since the introduction of these Regulations.

2.3.1.7 Monitoring of pesticide residues

The field of pesticide residues is governed by the following laws:

- Act Regulating the Sanitary Suitability of Foodstuff, Products and Materials Coming into Contact with Foodstuffs of health foods and products and substances that come into contact with food with the bylaws defining the permitted or acceptable levels of pesticide residues in foodstuff of plant origin in foodstuff of animal origin, in potable water, and the materials and articles which are intended for, or are in contact with foodstuff.
- the Plant Protection Products Act with the bylaws defining the proper use of PPPs and residues in agricultural products,
- Water Act with the bylaws defining the permitted or acceptable levels of pesticides in groundwater, surface waters (surface water courses, lakes, coastal seas, brackish waters and shell beds).
- Environmental Protection Act with other legislation and regulation in the field of environment defining the permitted or acceptable levels of pesticides in soil, waste, excavated material intended for soil recultivation, dykes and filling of spoils.

2.3.1.8 Review of the status of PPPs with POPs substances in Slovenia

2.3.1.8.1 The use of plant protection products with POPs in the past

In the period after 1945 when Slovenia was part of the Socialist Federal Republic of Yugoslavia (SFRY), it had to comply with national regulations combined with relevant provisions applicable to individual republics. The basic law on plant protection (Belgrade, 1954) prescribed the control of trade by means of PPP, prevention and control of plant pests, carrying out plant protection inspections, and penal provisions. The lists of registered substances, published in the Official Journals of Yugoslavia, shows that the POP substances: aldrin, DDT, dieldrin, endrin, hexachlorobenzene, heptachlor, chlordane and toxaphene, except mirex, were registered for use in agriculture.

In the period of Yugoslavia (1945 - 1990) a central register of pesticides was kept, and Slovenia therefore does not have separate data on their use. The information on the import, manufacture, sale and consumption of pesticides was actually collected only in Belgrade (Annex 2).

Given the low intensity of agricultural production, the use of preparations with POP substances in Slovenia was rather scarce, which is also indicated by the analyses for detecting pesticide residues in soil and crops.

In 1971, the first ban on pesticide use was introduced, applying to DDT, dieldrin and chlordane.

In Slovenia, the most frequent substance under the Stockholm Convention was DDT, used to control the Colorado beetle *(Leptinotarsa decemlineata),* orchard pests *(Quadraspidiotus perniciosus),* storage pests, and in veterinary and human medicine to control insects, transmitters of infectious diseases. DDT consumption was the highest between 1957 and 1962. After 1962, when resistance of Colorado beetle to DDT was identified in the Brežice area, the consumption declined. Endrin was longest in use in Slovenia, until 1989, against vole *(Arvicola terestris)* in fenced orchards. Toxaphene was used primarily for pest extermination, to control mice.

Dieldrin and aldrin were used against floor pests and in warehouses, but to a lesser extent than DDT.

Based on data on trade in PPP with POPs substances obtained from Agrotehnika Ljubljana, major Slovenian trading company at the time, an approximate calculation was done of the total turnover of plant protection products in Slovenia in the period when these substances were in use.

Trade data for the period 1957-1971 show the highest consumption of preparations based on DDT; they are followed by endrin, aldrin, dieldrin and toxaphene. According to this information, we did not use preparations based on hexachlorobenzene (HCB), heptachlor and chlordane in Slovenia, although these substances were registered in the Yugoslav market. Mirex, however, was not registered.

2.3.1.8.2 Manufacture of plant protection substances with POPs in the past

The Slovenian factory Pinus Rače produced certain POP substances used as pesticides (SC, Annex A, Part 1) for the common Yugoslav market in the period from 1959 to 1984. The programme of production included preparations with various concentrations of active substances aldrin, endrin, DDT, and dieldrin (Annex 2). The production of POPs substances with PPP was closed in 1984. Information on the sale in Slovenia and stocks of PPP containing POP substances does not exist.

Based on the research project, elaborated by the Centre for Environmental Protection at the Institute of Public Health Maribor in 1989, 'Development of methods and techniques for the production of toxic waste for deposit' it was found that the groundwater in Dravsko polje is contaminated with pesticides from contaminated groundwater around Brunšvik. Test excavations proved high concentrations of DDT, DEE, endrin and dietildrin, and pesticides mixed with oils, oil waste and various barrels. Near Kozoderčeva jama (Figure 1), the environmental activists discovered another cave only a hundred meters away, following local reports. It is called "Jama proti Brunšvigu", and is one-fourth the size of Kozoderčeva jama, and the so-called Križna jama near the village Brezola, which is considerably larger than the cave »Jama proti Brunšvigu«.

Activities relating to the former loads are included in the Action Programme and the necessary funds are provided in the operational programme 'Environmental and Transport Infrastructure Development 2007 – 2013'.

Figure 1: Kozoderčeva jama

2.3.1.8.3 Overview of old stocks of plant protection substances with POPs

Slovenia does not have records of stocks of plant protection products, which were in use in the period 1945-1990, when Slovenia was part of Yugoslavia. The URSK Working Group on Pesticides within the project of preparing the NIP in cooperation with the Agency of RS for Agricultural Markets and Rural Development made a survey of PPP stock among traders and agricultural holdings.

2.3.1.8.3.1 Results of accounting the stockpile of plant protection products with POP substance at PPs retail sellers (URSK Survey, 2004)

The URSK performed a survey with retail sellers of plant protection products listed in Annex 7, in March 2004. The questionnaires were sent to 239 addresses from the list of the registered PPP sellers (data from FURS). 50.8% of questionnaires were returned, (121), of which 109 were correctly completed.

The surveyed persons stated the sale of the following products in the period before 2004: Zlaticid, Neosol, aerosols, aldrin, dieldrin, Doripin, Gesarol, lindane, Linditin, Neocid, Pinodrin and endrin. These are no longer available, as the last supplies were sold in 1989, when the use of the last POPs pesticide, endrin, was prohibited.
The surveyed traders do not have in stock any plant protection products containing POP substances.

Data from the survey are not complete, as the number of sellers has changed since the time of the allowed sale of these products.

2.3.1.8.3.2 The results of registration of plant protection products and stocks - with POP substances in agricultural holdings (URSK Survey, 2004)

At the end of April 2004, the survey with the questionnaire from Annex 7 was sent to approximately 68,000 agricultural holdings in Slovenia and those listed in the register of beneficiaries of the subsidies for agricultural products. We estimate that the survey included most agricultural holdings.

The survey was performed with the help of farm advisory services at the Chamber of Agriculture of Slovenia. Farm advisors were informed of the purpose of the survey and provided assistance in completing the questionnaire.

The survey was answered by 26.4% of respondents, of which only 3.9% reported the use or supply of PPP with POP substances.

The survey showed that preparations with DDT were most widely used (Pantakan, Pepein and Zlaticid); these are followed by endrin, which was the longest time on the market among POPs substances. In Slovenia, 98% of PPP based on DDT were used, and less than 2% based on other POPs substances. The results regarding the trade slightly differ, but show the same ratio between the sale and the use.

Beside the amounts of PPP with POPs, the survey also included questions on stocks of old, unusable PPP with POPs on the farms.

Small stocks containing endrin (10 L), dieldrin (1 kg) and DDT (75 kg) were reported.

Safe disposal of old stocks of POPs substances PPP is envisaged in the Action Plan.

2.3.2 General legal framework and institutional scheme of PCB management in Slovenia

2.3.2.1 Legal basis

The basic documents governing the PCB issue in Slovenia are the Environmental Protection Act and the Regulation on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (Official Gazette of the RS, 34/08, 09/09).

The above stated Regulation binds Slovenia to finally take care, by the end of 2010, of all the equipment containing oils with more than 500 mg PCB/kg. As regards the PCB contaminated equipment containing oils in the range of 50-500 mg PCB/kg, decontamination has to be done, unless the lifetime of these devices has expired.

In addition to the mentioned Regulation which is the basis for achieving the ultimate goal - phasing out PCBs, some other regulations on the waste listed in Annex 5 regulate certain segments of the activities associated with the PCB issue. The rules applicable in this field include the provisions on safety and health at work, and the transport of hazardous substances and dangerous goods which are also listed in Annex 5.

The platform for phasing out PCBs and PCTs is provided by the following strategic documents, programmes and studies:

- National Environmental Protection Action Programme (NPVO), adopted by the National Assembly (Official Gazette of RS, No 83/99, 41/04.
- National Programme for the Adoption of the Acquis by the end of 2002 (MOP 1998),

- The concept of PCB / PCT Management in Slovenia, Institute of Public Health, Ljubljana, March 2000
- The Concept of Managing diffuse sources of PCB/PCT in Slovenia, C & G d.o.o., Ljubljana, November 2001
- Operational Programme on the elimination of polychlorinated biphenyls and polychlorinated terphenyls in the period from 2003 to the end of 2006 (Government Decree No RS. 354-24/2003-2 accepted on 27.02.2003).

Chronological overview of activities associated with PCBs:

- Elaboration of the study "The concept of PCBs Management in Slovenia at the end of 1999', which provided information on the PCB in Slovenia, as well as the preliminary list of the owners of PCB equipment in Slovenia
- Preparation of the rules governing the elimination of polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCT)
- The holders of PCB equipment annually submit data to MOP for the previous year (since 2000)
- Setting up database for the inventory of PCB devices in 2001 and persons subject to the above stated regulations
- Entry of data on PCB devices and relevant persons in the database, regular updating since 2000
- Elaboration of the study: The concept of Managing diffuse sources of PCB/ PCT in Slovenia in 2001
- Drafting of the Operational Programme on the elimination of polychlorinated biphenyls and polychlorinated terphenyls in the period from 2003 to the end of 2006 (Programme, Government Decree No 354-24/2003-2 of 27.02.2003) and amendment of the Rules in 2003
- Drawing up instructions for preparing the plan of eliminating PCB waste in 2003
- In the period 2004 -2006, the database on PCB facilities was updated with information about the plans for eliminating PCB waste.

2.3.2.2 Measures to reduce, control and eliminate PCBs in Slovenia

In the process of harmonising the national legislation, Slovenia adopted Directive 16/59/EEC which governs the PCB management and requires the elimination of any PCB equipment containing more than 5 dm^3 PCB by the end of 2010.

2.3.2.3 Action Plan based on the Operational Programme for eliminating PCB

The Operational programme was elaborated for the period of four years until the end of 2006 and was the extended by the Regulation on the disposal of polychlorinated biphenyls and polychlorinated terphenyls until the adoption of a new operational programme. The Action Plan is prepared as a sectoral programme within the National Environmental Protection Programme and the operational programme of environment protection related to waste agreement. Its purpose is to put the goals into practice by determining the scope and the time schedule for implementing the measures defined in the NPVO and the Strategic Guidelines of waste management in Slovenia at the

strategic level (and in terms of integral waste management in Slovenia), and to comply with the Slovenian legislation and EU guidelines on PCB management.

The key commitment in this field is to phase out all PCB equipment with oil contents of more than 500mg PCB/kg by 2010, while the PCB contaminated equipment with oils in the range of 50-500 mg PCB/kg has to be decontaminated (unless its lifetime has expired). As regards the equipment and devices with less than 500 mg PCB/kg, an integral plan for their collection and disposal had to be set up by the end of 2006.

2.3.2.4 List of records drawn up in the context of PCB

All records are created in line with the Rules on the disposal of PCBs and PCTs and the disposal programme. The records refer to the inventory of PCB equipment, disposal plans, collectors and exporters of PCB, storage facilities of PCB collectors, and to the exported and removed quantities of PCB.

2.3.2.5 Reporting and information

The holders of PCB equipment are obliged to report to MOP (EARS) of any changes in the inventory, and the latter forwards this information to the European Commission.

Table 4: Reporting

Activity / MOP	**Actors**	**Timing**
- Notifying PCB equipment or PCB waste, changes in PCB devices. - Reporting the generated and disposed PCB waste. - Reporting of PCB waste collected and forwarded for final disposal.	Holders of PCB devices or waste Holders of PCB devices or waste Persons collecting/ exporting or performing decontamination / exporters	Since 10 March 2001 (annually) Each year until 31 March of the current year 180 days after completing the final handling.
Competent authority / target public - Preparing general information on PCB issues, especially in everyday life (articles in daily press, round tables). - State of environment, objectives and achievements in controlling PCB issues by implementing the operational programme (annual and 4-year reports on the state of the environment, information publications, roundtables,..). - Preparing information on the obligations under EU directives and regulations. - Preparing information on the system of collecting data required to control PCB, and on the monitoring of PCB devices and waste.	MOP	Each year in January for the previous year.
MOP / EU Reporting to the European Commission on the implementation of Directive.	MOP / ARSO	2004 / I

2.3.2.6 Control of PCB equipment

The RS Inspectorate for the Environment and Spatial Planning monitors, in line with the Environment Protection Act, if entities comply with the provisions of relevant regulations. If non-compliance is established, it issues warning, decision or even prohibition to use the equipment containing PCBs in question. Entities are required to fulfil the imposed obligation within the time specified by the inspector, or else they are further punished.

In the first phase, inventory is established in companies using energy equipment containing PCBs (transformer, condenser) in line with Article 2 of the Rules on protection measures for work with substances containing polychlorinated biphenyls, polychlorinated naphthalenes and polychlorinated terphenyls). A company may have operational (connected), and non-operational equipment containing PCBs (backup, written-off, waste). Companies are required to show all written reference on equipment containing PCBs. The evidence must show that the company does not use any equipment containing PCBs with PCB, or it is deemed to be subject to Article 5 of the Rules. equipment containing PCBs with PCB include those where it is not evident from the documentation on their production or maintenance if they contain PCB or not. The company must obtain proof from the manufacturers of equipment containing PCBs (for transformers) that they were not filled with PCBs, or analyse PCB levels in oil in line with Article 7.

The company is obliged to notify the relevant ministry of all its operating and non-operating facilities (the form is on the ARSO website in line with the Regulation) which contain PCBs. The ARSO keeps the list of relevant entities). The time limit for the application has expired, but if the company has not reported the equipment containing PCBs so far, the inspector can order immediate notification. If the inspector has the information on the number of notified equipment containing PCBs and during the inspection finds different quantities, s/he may order notification of the change. In most cases the companies remove the equipment containing PCBs and does not report changes to ARSO.

In line with the regulations, companies may use such equipment containing PCBs only until 31 December 2010. In the meantime, they have to replace them with those which do not contain PCBs, or decontaminate them in the prescribed manner (PCB concentration <50 ppm). Thus, the company must draw up annual programmes for eliminating PCB until 2010. For each particular equipment containing PCBs, the company has to complete the form (it can be found on the ARSO website in line with the Regulation on the disposal of polychlorinated biphenyls and polychlorinated terphenyls), and send it to ARSO.

In case of operational equipment containing PCBs, the companies must take into account that equipment containing PCBs has to be properly labeled in line with Article 7 of the said Regulation. The label must be attached on the equipment containing PCBs and the gate leading into the premise where the equipment containing PCBs is placed. In line with Article 13 of the Regulation, the company must also mark decontaminated transformers accordingly.

In the case of deficient equipment containing PCBs, which constitute waste (if they are out of order and ready for removal), control is identical, except that companies must remove such equipment containing PCBs in a shorter period of time (the

maximum storage period is 2 years). The following provisions of the waste management regulation should be taken into account:

- methods of storage,
- labelling of waste,
- Waste management plan,
- hand over waste to a company that holds a permit for waste management (collector, disposer),
- keeping records and record sheets
- completing annual reports
- Keeping records for 5 years.

Another option is a decontamination of equipment. Even after decontamination, it is necessary to establish its effectiveness (with measurements, labelling the equipment with a plate). After removing these equipment or waste, the company must send notification to the competent Ministry within three months after the change has occurred.

Operating equipment containing PCBs in Slovenia may be used until 31 December 2010.

2.3.3 Overview of chemicals in Annex B of the Stockholm Convention

In Slovenia, DDT synthesis never took place, only preparations were formulated. Its use has been banned since 1971. Review of the situation is given together with POPs pesticides in section 2.3.1.8.

2.3.3.1 Overview of unintentionally produced POPs from Annex C; chemicals (PCDD / PCDF, HCB, PCB)

Unintentionally produced POPs substances are mainly released into the environment as emissions from various industrial plants. Data collection and drawing up emission inventories is the responsibility of ARSO (MOP), which cooperates with various professional institutions in Slovenia.

2.3.3.2 Legal bases:

- Stockholm Convention on Persistent Organic Pollutants,
- Protocol on Persistent Organic Pollutants to the Convention of 1979 on Long-Range Transboundary Air Pollution (POPs Protocol)
- Regulation 850/2004 of the European Parliament and of the Council on persistent organic pollutants and amending Directive 79/117/EEC of 29 April 2004.

2.3.3.3 The overall legal framework and institutional arrangements

Slovenia has fully harmonised its obligations and legal bases governing the field of POPs emissions into the environment with the applicable European regulations.

Below, an overview of applicable environmental regulations in Slovenia is presented which are in any way connected with the pollution with unintentionally produced PCBs, dioxins, furans and HCB. Usually, these rules include polyaromatic hydrocarbons (PAH) and hexachlorocyclohexane (HCH) which are not included in the Stockholm Convention.

All environmental regulations were included in the Slovenian law before Regulation 850/2004 was issued, therefore the provisions of the regulations on unintentionally produced POPs do not take into account all the provisions of this Regulation.

The regulations are categorised by emissions into air, emissions with waste water, waste, and soil.

Air emissions, dealing with:

- Decree on the emission of substances into the atmosphere from stationary sources of pollution (OG RS, No 31/07)
- Rules on initial measurements and operational monitoring of the emission of substances into the atmosphere from stationary pollution sources and on the conditions for their implementation (OG RS, No 70/96, 71/00, 99/01, 17/03).
- A number of regulations and rules governing emissions from individual facilities and installations.

Among unintentionally produced POPs under Stockholm Convention, the Slovenian regulations consider only HCB and PCDD / PCDF as POPs emissions into air.

Decree on the emission of substances into air from stationary sources applies to all sources of air emissions, other than those addressed by specific regulations. The set of parameters subject to operational monitoring or reducing the emissions (limit values) is in the Rules on initial measurements and operational monitoring of the emission of substances into the atmosphere from stationary pollution sources and on the conditions for their implementation and in the regulation. The Rules govern only HCB and PCDD/PCDF among POPs. Among unintentionally produced POPs, PCB is not considered, while HCH is included, although it is not among the unintentionally produced POPs in the Protocol or the SC.

None of the regulations on emissions into the atmosphere prescribes limit values for HCB, they only require monitoring.

As to PCDD/PCDF, the only prescribed limit values refer to incineration and co-incineration of waste. The maximum value is 0.1 ng TE/m^3 for incineration or any co-incineration. For example, furnace for clinkers, heating appliances or other industrial ovens do not have prescribed limit values, but if waste is burnt in these plants, the PCDD/PCDF emissions are limited to 0.1 ng TE/$m^{3.}$

In Article 20(5) and (6), the stated regulation deals with air emissions during the production or formulation of pesticides. The limit value for particles in waste gases is 5 mg/$m^{3.}$ Formally, all the POPs substances stated in the Protocol and the SC can be included, whereby the prescribed limit expressed as the sum, applies to them as well.

Emissions from waste-water are treated in the following acts:

- Decree on the emission of substances and heat in the discharge of wastewater into waters and public sewage system (OGRS, No 47/05, 45/07).

- Rules on initial measurements and operational monitoring of waste water and on the conditions for its implementation (OG RS No 35/1996, 29/2000, 106/2001, 41/04).
- A number of regulations and rules governing emissions from individual facilities and installations.

Decree on the emission of substances and heat in the discharge of wastewater into waters and public sewage system applies to all sources of waste water emissions, except those subject to special regulations. The set of parameters subject to operational monitoring or reducing the emissions (limit values) is in the Rules and also in the framework regulation, and in some sectoral regulations. The Rules mentions only HCB among POPs. Among the unintentionally produced POPs, the PCB and PCDD/F are not considered.

The decree does not specify any of the POPs substances and thus no general limit values for POPs that would apply to any sectoral regulation specifically providing for POPs emissions. Only in case of low annual quantities of released substances, an application to waiver or reduce the frequency of HCB, HCH and PAH monitoring can be made in line with the decree. Emissions of PCB liquid waste are not covered by decrees.

Some specific regulations quote various POPs, as well as limit values for emissions from waste water systems. Those regulations are listed below.

Emissions of PCDD/F from waste water treatment plants are dealt with only by the Decree on the emission of substances in the discharge of waste water from cleaning of exhaust gases from incineration and co-incineration plants. For the stated waste water, the maximum level of PCDD/F is 0.3 ng/l.

The Rules on initial measurements and operational monitoring of waste water and on conditions for its implementation do not specify limit values for the emissions of these POPs from waste water. It does state the measurement methods for all the POPs from the Protocol and the SC, except for toxaphene, mirex, chlordecone, and chlordane.

The stated decrees on the emissions from waste water in the Republic of Slovenia deal with: HCB, PCDD/F, PAH, aldrin, dieldrin, endrin and DDT among the POPs substances stated in the Stockholm Convention.

POPs emissions of waste water, save unintentionally produced, are especially heavy from installations where PPPs and biocides are either produced or formulated. These emissions are treated by the Decree on the emission of substances in wastewater discharges from the facilities for the production of plant protection products (Official Gazette of RS, No 84/1999). These facilities produce or formulate PPP and biocides. The decree does not envisage PCB, PCDD/F and HCB emissions, but DDT, aldrin, dieldrin, endrin and HCB emissions. Limit values and POPs emission factors are given below.

Table 5: Limit values for POPs emissions in waste water from the manufacture of PPP

POPs	**Activity**	**Limit values of POPs** (mg/l)	**Limit values of the emission factor** (g/t)

		Daily average value	Monthly average value	Daily	Monthly
DDT	Production and formulation at the same place (including the production of dicofol)				
	- Existing sources	0.4	0.2	8.0	4.0
	- New sources	0.2	0.1	4.0	0.5
Drines	Production and formulation of aldrin and/ or dieldrin and/or endrin and/or isodrin in the same place	0.01	0.002	15.0	3.0
HCB	HCB production and processing (including the production of quintozene and tecnazene)	2.0	1.0	20.0	10.0

Decree on the emission of dangerous halogenate hydrocarbons in discharge of waste water deals with the emissions of various halogenated hydrocarbons, but only HCB is mentioned among the POPs. It analyses the synthesis methods of these hydrocarbons and their use in different procedures and processing industries. As regards HCB, it states the limit values and emission factors listed in Table 6.

Table 6: Limit values for HCB emissions in waste water originating from the manufacture and use of hazardous halogenated hydrocarbons

POPs	Activity	HCB Limit values (mg/l)		Limit values of the emission factor (g/t)	
		Daily average value	Monthly average	Daily	Monthly
HCB	Production of tetrachlorethene and tetrachlormethane by perchlorination	3.0	1.5	3.0	1.5
	Production of trichlorethene and/or tetrachlorethene with other procedures	3.0	1.5	3.0	1.5
	The use of HCB in processing industry	2.0	1.0	20.0	10.0

Decree on the emission of substances in wastewater discharges from the facilities for the production of non-ferrous metals regulates the HCB emission in waste water from the gas treatment plants in refining aluminum with chlorine. Limit value for waste water is 0.003 mg/l of aluminum.

Waste

The sphere of waste management is governed by the regulation which determines the methods of waste management, the conditions for the collection and transport, processing and disposal of waste, and lists by categories. It deals with POPs substances within the scope of other hazardous substances (toxic substances, carcinogens, mutagens, substances which are extracted). Since most POPs from the SC and the POPs protocols have at least one of those properties, the waste containing POPs above the prescribed limits is dangerous.

The list of "waste" in this regulation is categorised by numbers referring to the source generating the waste, and hazardous waste is marked with an asterisk (*).

Dangerous properties of particular wastes and ways of their identification are marked with the letter H and the corresponding number: H4-irritant waste H5-harmful waste, toxic waste-H6, H7-carcinogenic waste, H10- toxic for reproduction, H11-mutagen waste, and H13-waste presenting the risk of leaking substances with the above stated properties. If the maximum concentrations in waste are exceeded, such waste is considered as hazardous waste.

In the said regulation, the POPs substances are specifically mentioned only in item H13: PCB (with a limit value in waste 100 mg/kg s.s.), and PCDD/F (with a limit value in waste 10 000 ng TE/kg s.s.). The stated limit values are used in classifying waste into hazardous or non-hazardous. In this classification, the said criterion applies only to certain types of waste equipped with a classification number and an asterisk if they contain hazardous substances; or with the next classification number and an asterisk if they do not). For most categories (i.e. by source of generation), the list contains the hazardous waste that might contain POP substances. The latter are specifically mentioned only under '(PCB) waste generated under demolition'.

The regulation governing waste disposal, defines the PCB limit values (1 mg/kg s.s.) as a criterion for disposal of inert waste. In line with these provisions, the parameter of PCB contamination is the sum of PCB 28, 52, 101, 138, 153 and 180.

The regulation governing the incineration of POPs substances lists only PCB among the parameters for waste analysis (together with PCT). No limit value is specified.

The set of regulations on waste includes two sectoral regulations, presented in Annex 5, which govern the handling of PCBs and PCTs and waste oils.

Other regulations governing waste management do not specifically mention POPs, but their provisions often refer to the waste that may be contaminated with POPs. A specific example of these rules is the regulation covering the management of waste arising from construction work. It deals with waste from a group of construction waste and demolition waste from the classification list. This group includes PCB containing construction and demolition wastes (for example, seals containing PCB, resin-based floorings containing PCBs, power capacitors containing PCBs ...).

Soil

The basic rule sets the maximum levels for the entry of hazardous substances and fertilizers into the soil by releasing manure in the agricultural land; and the use of compost, sewage sludge and sludge in the agriculture. Among POPs, only limit values for PCB in soil are listed (1 mg/kg for PCB s.s), in compost with limited use and in the sludge from treatment plants (equally, 1 mg/kg for PCB s.s).

In addition to the above regulation, release of waste into soil is dealt with by the regulation covering the load on the soil by waste, laying down the conditions for the entry of excavated soil, waste processed into artificially prepared soil, construction waste processed into building materials, animal waste, municipal sludge from purification plants and organic waste processed into compost, if they are inserted as a plant nutrients, and waste generated in exploiting the mineral resources. Waste has to be processed in such a manner and in compliance with the regulation governing waste that their release is for the benefit of agriculture or the environment. Among POPs, the regulation states only the limit values for PCB and PAH. Limit values for excavation and for artificially prepared soil are 0.1 mg PCB/kg. Only in the case of inserting the excavated soil below the groundwater level, the limit values for PCB in

the effluent is 0.005 mg/l. In line with this regulation, the parameter of contamination with PCB is the sum of PCB 28, 52, 101, 138, 153 and 180.

2.3.3.4 Overview of the sources of unintentionally produced POPs in Slovenia

The current situation in State emission inventories (DEE) on Persistent Organic Pollutants (POPs): in the period 1990 - 2006, the inventory of emissions includes polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAH): indeno (1,2,3)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dioxins /furans (D/F) and hexachlorobenzene (HCB). The calculations of these emissions are made with emission factors from the manual OSPARCOM-HELCOM (Technical Paper to the OSPARCOM-HELCOM UNECE Emission Inventory (Emission Factors Manual PARCOM-Atmos). POPs emissions were calculated at the national level and are divided into 11 main categories of sources (SNAP1). The input data for calculating air emissions are taken from the statistics.

Figures 2 to 6 show the emissions of PCB, PCDD/F, PAH (sum of individual pollutants: indeno(1,2,3)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo (a)pyrene) and HCB in the period 1990 - 2006. The records of these emissions are unreliable, which means that more accurate records will soon have to be prepared. Table 7 shows the main categories of sources of POPs emissions into air in Slovenia.

Table 7: Main sources of emission of individual POPs pollutants by SNAP classification

*** SNAP classification**	**HCB**	**PCB**	**PAH**	**PCDD / DF**
1 - Energy and district heating	X	X	X	X
2 - Small furnaces	X	X	X	X
3 - Industrial boilers	X	X	X	X
4 - Technological processes	X	X		X
5 - Production and distribution of fossil fuels and geothermal energy				
6 - Use of solvents and other products		X		
7 - Road transport	X		X	X
8 - Other transport equipment and devices				
9 - Waste treatment and incineration	X	X		X
10 - Agriculture	X			
11 - Other sources and sinks				

*SNAP – Standard Nomenclature for Air Pollution

Figures from 2 to 6 show that none of the pollutants exceed the values from 1990, which means that they comply with the requirements of the POPs Protocol stating that no pollutant may exceed the emissions from the reference year 1990.

Table 8: National emissions and trends for reducing POPs for the period 1990 to 2006

	PCB	PCDD/ PCDF	benzo(a) Pyrene	benzo(b) Fluoranthene	benzo(k) Fluoranthene	Indeno (1,2,3)Pyrene	PAH	HCB
Year	kg	g I-Teq	Mg	Mg	Mg	Mg	Mg	kg

1990	387.28	16.45	3.69	4.34	1.63	2.89	13.43	46.68
1991	382.54	16.81	3.91	4.51	1.87	3.04	13.31	40.66
1992	343.69	15.29	3.77	4.97	1.79	2.86	13.38	37.52
1993	319.08	13.86	3.66	4.80	1.70	2.73	12.89	37.73
1994	291.39	13.11	3.57	4.68	1.66	2.62	12.51	37.52
1995	257.71	12.37	3.48	4.58	1.62	2.54	12.21	37.44
1996	238.95	12.19	3.49	4.53	1.61	2.52	12.14	36.20
1997	223.65	11.64	3.44	4.50	1.58	2.45	11.95	37.58
1998	212.60	11.42	3.42	4.48	1.57	2.43	11.88	37.26
1999	179.76	11,22	3.42	4.47	1.55	2.42	11.85	37.79
2000	168.31	11.15	3.78	4.46	1.55	2.40	12.20	38.15
2001	151.41	10.24	2.97	3.84	1.35	2.09	10.25	38.13
2002	123.09	10.31	3.00	3.93	1.42	2.10	10.46	0.34
2003	110.72	10.86	3.20	4.09	1.51	2.29	11.08	0.34
2004	82.51	9.15	2.91	3.89	1.40	2.05	10.25	0.31
2005	74.95	8.57	2.96	3.83	1.38	2.04	10.20	0.30
2006	47.49	8.38	2.94	3.83	1.38	2.04	10.21	0,30
trend of reduction	*-87.74*	*- 49.03*	*-20.32*	*-11.75*	*-15.34*	*-29.41*	*-23.96*	*-99.36*

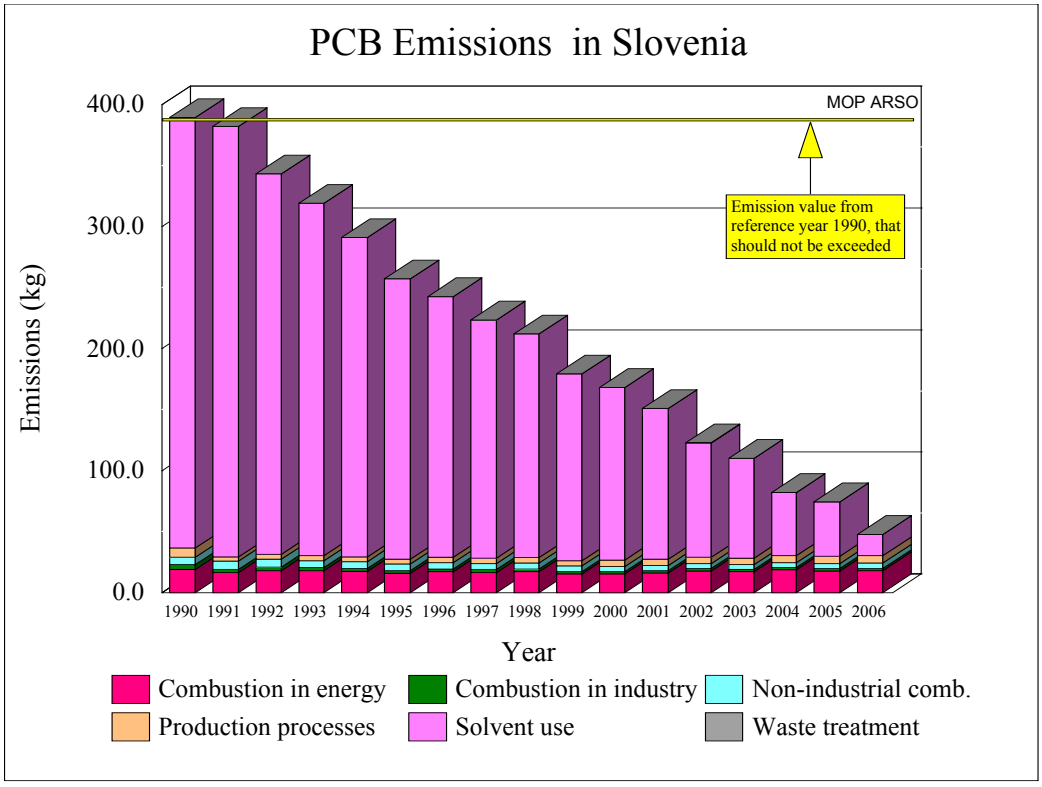

Figure 2: Emissions of polychlorinated biphenyls into air (PCB) for the years 1990 to 2006. The main sources of categories according to SNAP are given in Table 7.

The main source of PCB emissions into air in Slovenia are emissions from electric equipment (power capacitors and transformers), which is 60% of the total PCB emissions. The annual reduction is the result of the planned removal of PCB oils from electric equipment.

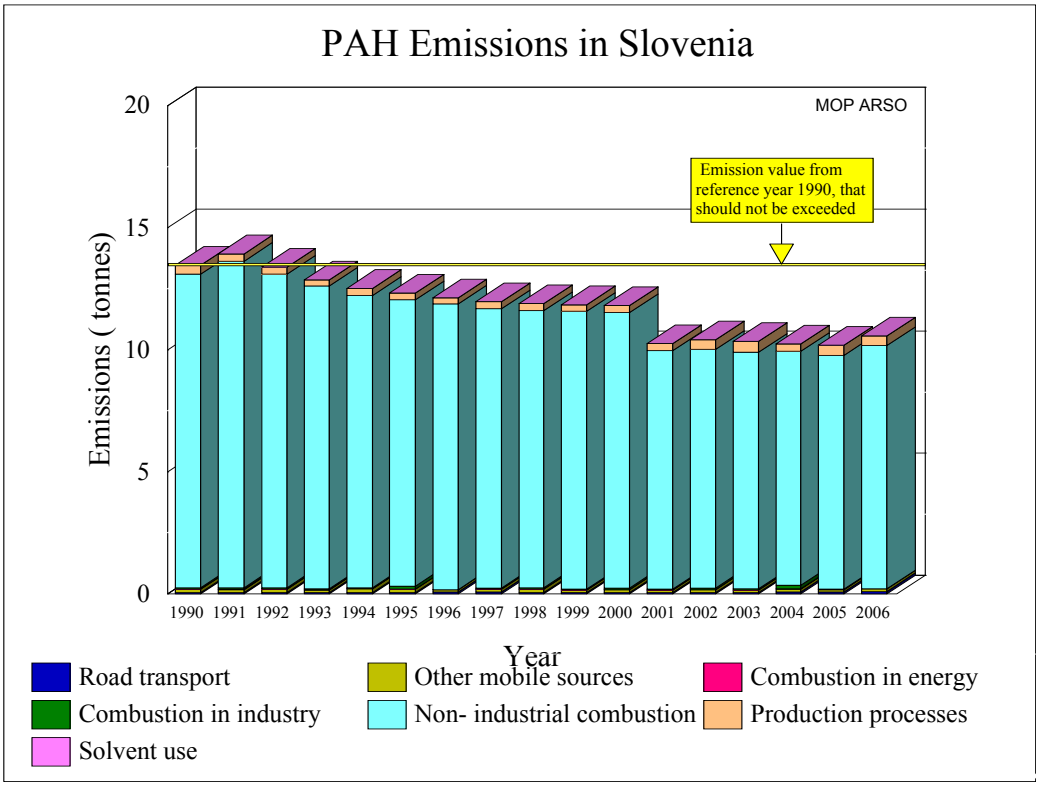

Figure 3: Emissions of dioxins/furans into air (D/F) between 1990 and 2006. The main sources of categories according to SNAP are given in Table 7.

The main sources of PCDD/DF emissions are small furnaces, energy supply and technological processes. Reduced emissions are mainly the result of lesser fuel consumption in small furnaces, introduction of district heating, and the replacement of solid and liquid fuels by gas.

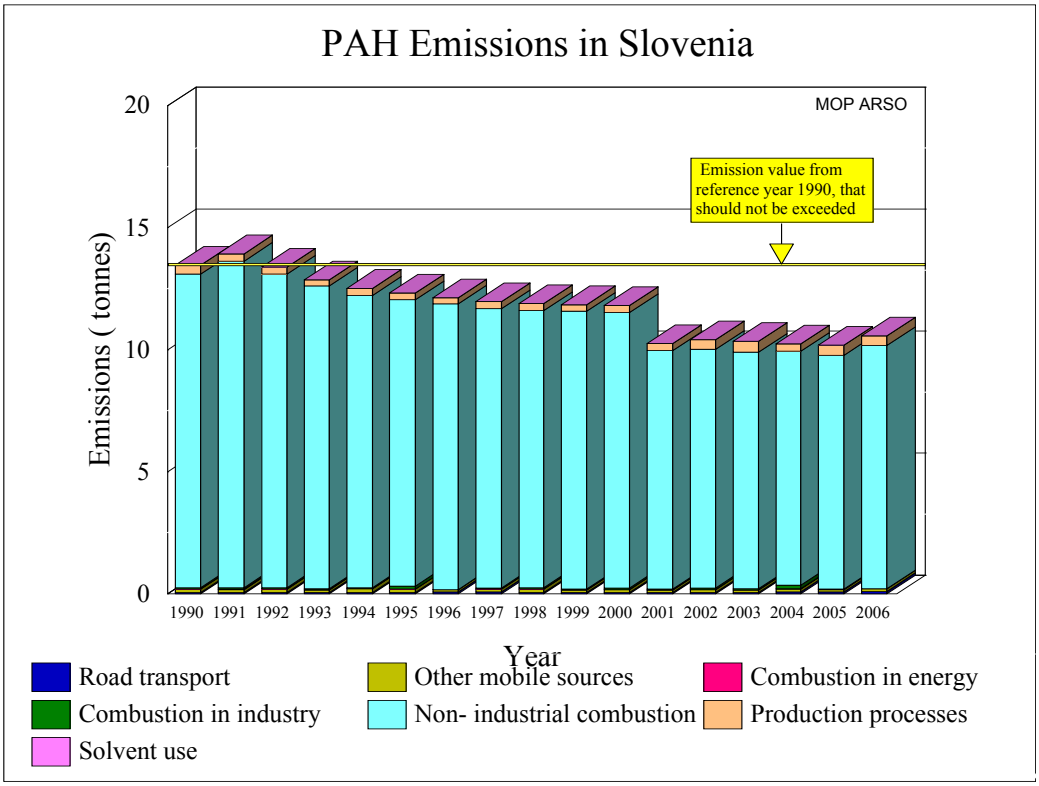

Figure 4: Total emissions of polycyclic aromatic hydrocarbons (PAH) into air (PAH: indeno (1,2,3)pyrene, benzo(b)fluoaranthene, benzo(k)fluoaranthene, benzo(a)pyrene) in the period 1990 to 2006. The main sources of categories by SNAP are given in Table 7

The main source of PAH emissions are small furnaces. The reduction is the result of improved technologies, thus the emissions per unit of product are getting lower. Less fuel consumption in small furnaces also contributes to reduction.

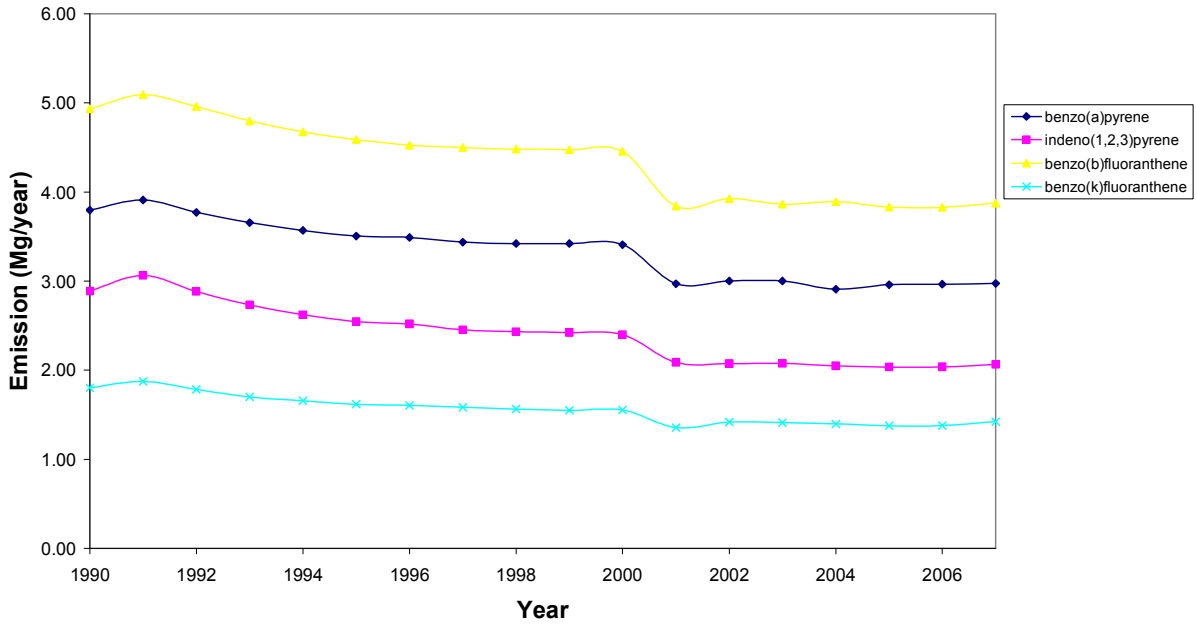

Figure 5: Emissions of polycyclic aromatic hydrocarbons into air: indeno(1,2,3)pyrene, benzo (b)fluoaranthene, benzo(k)fluoaranthene, benzo(a)pyrene) between 1990 and 2006.

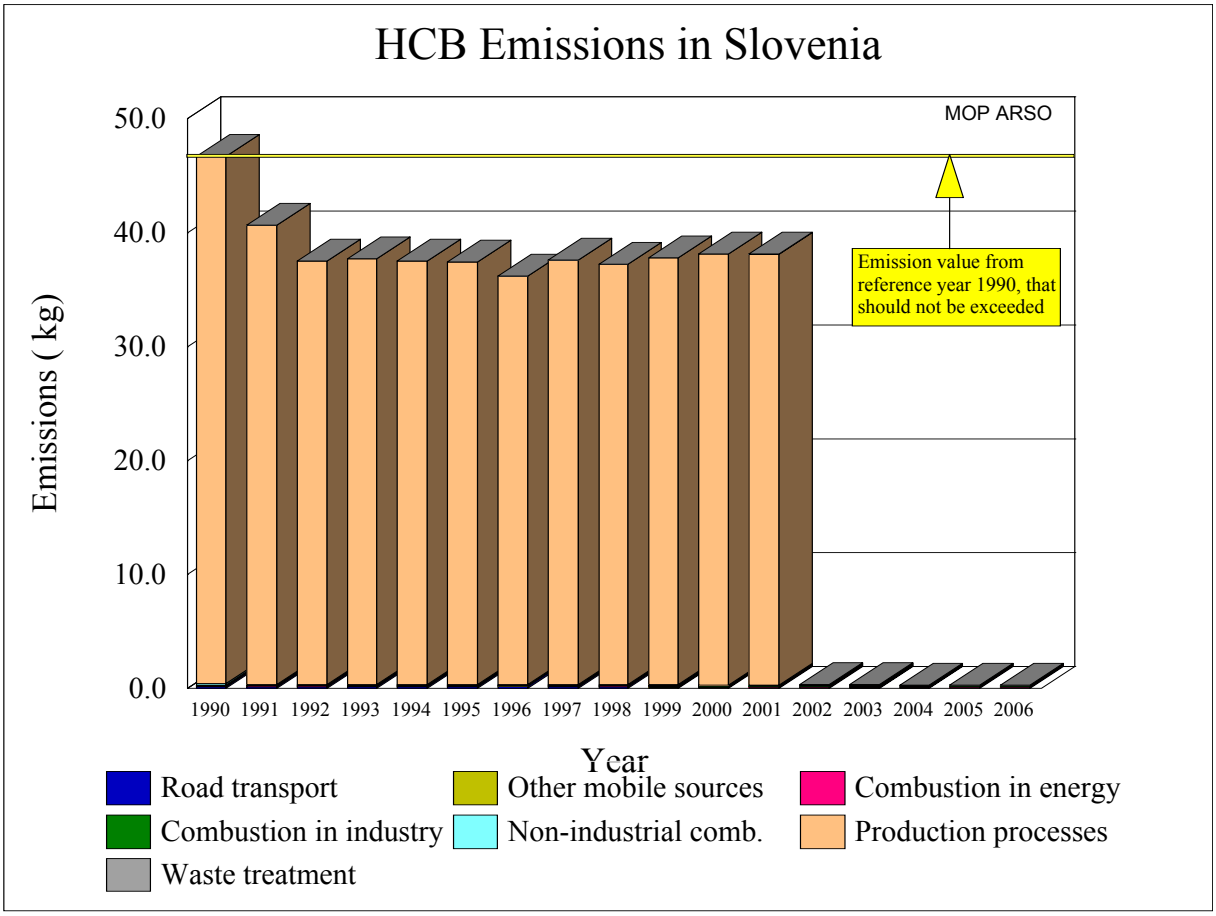

Figure 6: Emissions of hexachlorobenzene (HCB) into air between 1990 and 2006. The main sources of categories by SNAP are given in Table 7

Emissions of HCB in Slovenia in the last 4 years are extremely low. The main sources of HCB emissions were technological processes by 2002. Decrease since 2002 reflects the improvements in technology, particularly the production of primary aluminum.

2.3.3.5 The list of emission of unintentionally produced POPs into the environment and description of controls

ARSO manages two types of emission databases, which also include the emissions of unintentionally produced POPs: the National Emissions Inventory (DEE) and the REMIS register.

The National Emissions Inventory (DEE) includes systematically collected data on pollutants by years. They have to be transparent, repeatable and comparable with other countries. It only deals with air emissions. Therefore this database was made by using the single European Methodology EMEP/CORINAIR (Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air pollutants in Europe/The Core Inventory of Air Emissions in Europe). Emissions are

calculated from statistical data by using emission factors. Input data used for the calculation of emissions were taken from the:

- Statistical Yearbook of the Energy Economy of the RS,
- Statistical Yearbook,
- The results of the survey - annual review of the industry
- Emission inventory of stationary sources of pollution (REMIS), based on annual reports on emissions.

The emission factors published in manuals and used in cases where no available national emission factors exist include:

- CORINAIR Inventory, Default Emission Factors Handbook, Jan. 1992,
- Atmospheric Emission Inventory Guidebook, Sept. 1999 (Vol. 1, 2 and 3),
- IPCC Guidance for National Greenhouse Gas inventories, 1996,
- Technical Paper to the OSPARCOM-Helcom-UNECE Emission Inventory of Heavy Metals and POPs.

The REMIS register serves as a basis for EPER. Monitoring of emissions from industrial plants is regulated by the Rules on initial measurements and operational monitoring of emissions into air from stationary sources, and the conditions for its implementation. The Rules impose the duty of annual measurements of emissions. Based on these measurements, an annual report is made which has to be forwarded to ARSO by 31 March next year. Under IPPC, all the parameters set out in Annex 4 of the Rules have to be measured, unless a special permission from ARSO is obtained for the suspension of measurements. The following POPs are included: dioxins/furans, hexachlorobenzene and polycyclic aromatic hydrocarbons. The ARSO keeps the register of all the emissions.

2.3.3.6 The reporting scheme

ARSO sends annual reports to the UN Economic Commission for Europe (UN ECE) on POPs emissions into air in line with the 1979 Convention on Long-Range Transboundary Air Pollution (CLRTAP). Unintentionally produced POPs which are subject to annual inventory and reporting are: PAH, HCB and PCDD/PCDF. Slovenia also reports the PCB emissions. Reports on POPs emissions into air are made on the prescribed tables, and have to be submitted no later than each 15 February for the previous year.

2.3.3.6.1 Assessment of PCCD/PCDF emissions into various recipients (soil, air, products and residues) in Slovenia

Table 9 shows the main sources by categories which are taken into account in the "Toolkit" for: air, water, soil, products, and residues. The calculation of air emissions in Slovenia and the prescribed emission factors are taken from the Emission Inventory Guidebook, Technical Paper to the OSPARCOM-HELCOM UNECE Emission Inventory of Heavy Metals and Persistent Organic Pollutants, Pacyna et al., 2003. "Toolkit" also takes account the calculation for other segments, therefore it was used for calculating the emissions into soil, water, products and residues, where possible. This is determined by the current input data (obtained from the Statistical

Office of the RS) and the corresponding emission factor according to the "Toolkit" methodology (UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2003, http://www.pops.int/documents/guidance/Toolkit_2003.pdf.).

Table 9: Main sources of categories for PCDD/DF into specific segments of the environment

No	The main sources by categories	AIR	WATER	EARTH	PRODUCTS	RESIDUES
1	waste incinerations	×				×
2	iron and non-iron metal production	×				×
3	thermal power plants and heating	×		×		×
4	production of mineral products	×				×
5	transport	×				×
6	uncontrolled combustion processes	×	×	×		×
7	production and use of chemicals	×	×		×	×
8	mixed	×	×	×	×	×
9	removal	×	×	×		×
10	identification of potential hot spots	registration only in the specific case on a specific spot				

Figure 7 shows emissions into products for the series of years from 1990-2006. As to other media, emission factors are not determined, or the input is missing, so the calculation was not possible. The main sources of emissions of unintentionally produced products in the PCDD/DF are: generation of power and heating, manufacture of iron and non-ferrous metals, production of mineral raw materials (cement), hazardous waste incineration, and manufacture of pulp and paper.

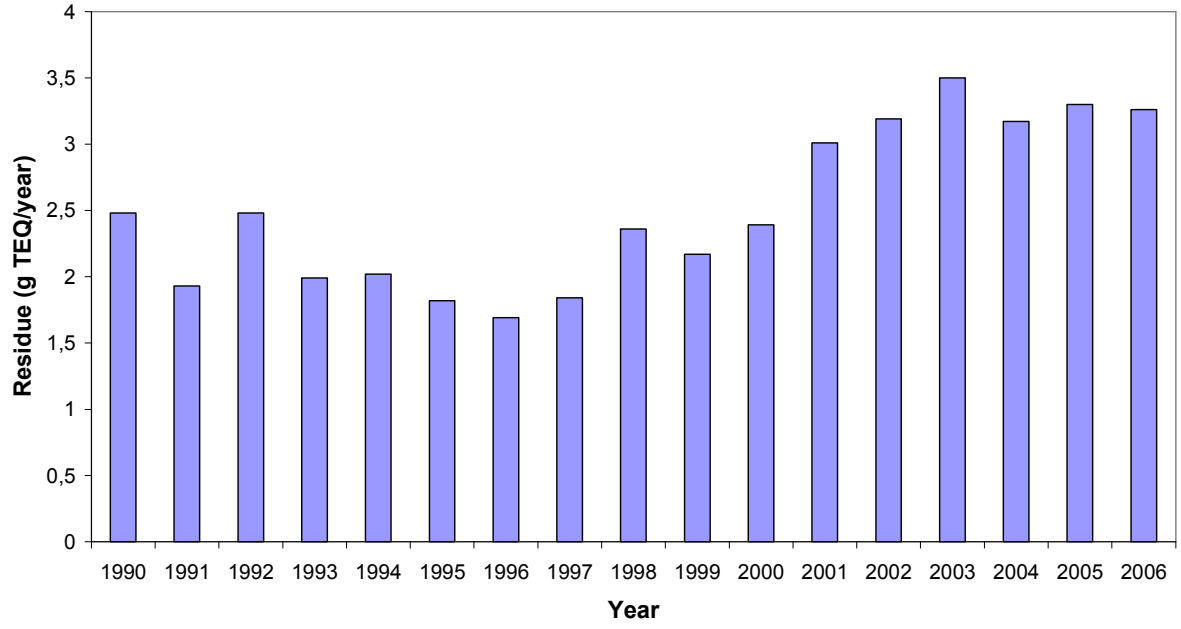

Figure 7: Emissions into products for PCDD/DF for the years 1990 to 2006 according to the "Toolkit" methodology

2.3.4 Information on the inventory of stocks, contaminated areas and wastes, remediation procedures and imission levels

2.3.4.1 Overview of the situation in the field of PPP with POPs substances in Slovenia

There is no significant stockpile of PPP with POPs in Slovenia, (see the 2004 survey of agricultural holdings, URSK), production or sale, as these have been prohibited for more than a decade. There are some small residues of old stock at some farms. Due to improper waste and packaging disposal into environment in the past, some point pollutions may exist which have not been registered yet.

The results of the analysis of pesticide residues with POPs on/in agricultural produce and soil indicate a small contamination due to agricultural use.

The problem is point contamination of some water sources with pesticides as a result of uncontrolled disposal of chemicals in municipal landfills in the past (e.g. Brunšvig).

2.3.4.2 Overview of the situation in the field of PCB in Slovenia

2.3.4.2.1 Production and use of PCBs in Slovenia

In 1962, the factory Iskra Power capacitors in Semič started with the production of power capacitors using PCBs as dielectric. Until 1970, the factory used a commercial bland of PCB Clophen A-30 and A-50 (Bayer, Germany) with 30% and 50% chlorine content; and from then until 1985 the PCB with the commercial name Pyralen 1500 (Prodelec, France) with a similar chlorine content as Aroclor 1242 (42% Cl). The PCB impregnant consumption in the period 1962-1984 (after 1984, PCB was banned in industrial production) totalled 3,700 tonnes, where the quantity of all residues was about 7% - technical reject: waste power capacitors and waste impregnant.

PCB balance in the factory Iskra Power capacitors Semič from 1962 until February 1985 -when the use of PCB in manufacture was prohibited:

- PCB consumption (built into power capacitors): 3443.2 tonnes
- Technology residue (waste) of PCB: 246.1 tonnes

Until 1985, there were 246.1 tonnes of residual PCB: 6.2 tonnes were unused and sold away, 169.9 tonnes destroyed by exporting and burning, and 70 tonnes PCB were emissions and waste deposited around Semič.

2.3.4.2.2 Disposal of PCBs in Slovenia

Article 2(6) of the Regulation on the disposal of polychlorinated biphenyls and polychlorinated terphenyls allows removal of used PCB or facilities according to the operation procedures D8, D9, D10 D15 and in exceptional cases D12 (Annex 6 of the waste management regulation). They are defined as follows:

D8: Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12;

D9: Physico-chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 (e.g. evaporation, drying, calcination, etc.)

D10: Incineration on land

D11: Incineration at sea

D12: Permanent storage (e.g. emplacement of containers in a mine, etc.).

The procedure of disposing D10 OCB waste (liquid PCB, transformers, power capacitors) is possible in France. In Germany, the liquid PCB and transformers may be disposed in line with D10 operation, while the D12 procedure applies to power capacitors. All other PCB waste, e.g. contaminated soil or concrete, is disposed in line with the procedure D12 in all the importing countries.

Slovenia does not have its own options for disposing PCB equipment and can not afford to plan them, therefore it recommends the export of PCB waste to other EU countries as special and hazardous waste.

2.3.4.2.3 Disposal of non-point PCB sources

The estimate of the extent of non-point PCB sources in Slovenia is based exclusively on the assessment of small pyralene power capacitors by groups and levels of technological processing of PCB sources:

1. production of small pyralene power capacitors,
2. production with direct use of small pyralene power capacitors, production of lamps, single-phase induction motors (electric motors), output voltage stabilizers,
3. production of devices, appliances, machines and other equipment with single-phase induction motors.

The legislation on non-point PCB sources follows Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT), which in Articles 6 and 11 regulates the collection and removal of equipment with PCB/PCT volumes of less than 5 dm^3. The Order on the handling of separate fractions at carrying out the waste management municipal service (OG RS, No 21/01) and the Regulation on the management of waste electrical and electronic equipment regulate organized collection of diffuse PCB sources, since they introduce the obligation to collect and separate hazardous factions in collecting communal waste and the used electric and electronic equipment.

The above stated order provides the minimum scope and content of managing the separately collected fractions, which has to be provided within the municipal waste management service. This public service includes the management of separately collected fractions which form part of municipal waste generated in households, and

the waste from industry, trade and service sector whose structure is similar to the household waste.

Separately collected fractions of municipal waste are divided into two groups: the non-hazardous and hazardous fractions with one or more hazardous characteristics from the regulation governing the waste management (discarded electrical and electronic equipment).

2.3.4.2.3.1 Estimated costs of non-point PCB sources rehabilitation in Slovenia

We estimate that in 2001, the number of power capacitors held by households and other entities (industry) in Slovenia was 2,749,544, with a mass of 646,800 kg and PCB share 215,600 kg. Table 10 shows estimated data for the major PCB diffuse sources according to the statistics in 1985.

Table 10: Diffuse sources of PCBs in Slovenia

Statistic in 1985	Number	PCB Factor	PCB Mass (kg)	Mass of capac. (kg)
Households	594,571	1	59,500	178,500
Active - employees	768,415	1 +1	153,700	461,100
Street lighting	47,144	0.5	2,400	7,200
Total power capacitors	2,749,544		215,600	646,800

Estimated costs of rehabilitation of the said quantities of diffuse PCB sources under the current calculation would be around EUR 3,200,000 for the year 2001.

We estimate that all the entities (PCB owners, collectors, exporters) involved in non-point PCB sources management will collect about 647 tonnes of non-point sources of PCB which had ended in the environment in an uncontrolled way.

2.3.4.2.4 Removed PCB

Following the setting up of a single registry of PCB equipment and waste holders it was found that the exports for removing PCB from Slovenia were 694,736 kg by the end of 2000; 855,330 kg by the end of 2002; and 899,710 kg by the end of 2003.

2.3.4.2.4.1 Overview of the situation in PCB disposal

In 2001, the database included 157 registered holders of PCB equipment, where the total net amount of PCB equipment in all devices was 118,503 kg, of which the total net amount of PCB in capacitors was 61,723 kg, the total net amount of PCB in transformers was 34,183 kg, and the total net amount of other equipment cotaining PCBs was 22,597 kg. We estimate that the database included all major PCB holders.

We estimate that the main part of phasing-out PCB equipment will be completed in the period 2006-2010 in line with the plan of PCB removal in the entire territory of Slovenia including the replacement of fills and decontamination of PCB equipment, or detailed chemical analyses of fills and the end of the lifetime of facilities in the next few years. According to the preliminary analysis of PCB quantities performed with a survey in 1998 and 1999, it was found that around 500 tonnes of PCB waste existed in Slovenia at that time (transformers and large capacitors), and around 100 tonnes of contaminated oil with more than 50 ppm PCB (transformers), while the major PCB share is still inside the plants in operation.

Export of PCB wastes for final removal in 2003

According to hazardous waste management data, 21,540 kg oil for insulation or heat transfer containing PCB was shipped to France for removal in 2003, and 24,286 kg of transformers and capacitors containing PCB were shipped for removal to Germany.

Plan of removing PCB facilities in 2005

Table 11 shows gross quantities of equipment cotaining PCBs which are (not) in use and were planned for removal in 2005.

Table 11: Gross quantities of PCB equipment to be removed in 2005

	PCB equipment in use	PCB equipment not in use
Number of liable persons who submitted notification	85	16
Total gross amount of PCB capacitors	138,807 kg	22,946 kg
Total gross amount of PCB transformers	181,476 kg	8,400 kg
Total quantity of PCB oils and other devices	8,185 kg	200 kg
Total gross amount of PCB equipment	328,468 kg	31,546 kg
Total gross amount of transformers in electric power distribution without data on PCB content	9,427,483 kg	100,233 kg
Total gross amount of transformers in electric power distribution which could contain PCB (based on analyses)	50,870 kg*	1,002 kg*

**The electric power distributors estimate that according to the analyses, less than 1% of all transformers actually contain PCB.*

Decontamination of PCB transformers

So far, 2746 transformers were inspected and tested of the total number of 8702 transformers. Total mass of transformers with no data on PCB contents is 9,427,483 kg. Transformers which contained PCB were decontaminated. This was carried out by the C&G company from Ljubljana, licensed for PCB equipment decontamination.

Collectors of used PCB devices and their capacity for temporary storage

In Slovenia, 17 collectors of PCB waste are registered. Their total surface capacity for temporary storage is 700 $m^{2.}$

The planned measures are in line with the Operational Programme for PCB Removal.

2.3.4.2.5 PCB contaminated sites in Slovenia

Leaching, rinsing and air transfer of PCB are major sources of the expansion of PCB contamination into Slovenian environment. PCB concentrations in air depend on the emission quantities and PCB evaporation from contaminated soil, water and sediments, on the weather conditions and transport processes in the air (diffusion, advection, rinsing, sedimentation).

Sources of PCB contamination in Slovenia were:

1) production / technological processes,
2) deposited PCB waste,
3) contaminated areas and, in particular, polluted water tanks, and
4) physical, chemical, biological processes and transport of PCB in contaminated areas.

The main source of PCB contamination of groundwater and surface water in Slovenia include waste and PCB leakage from landfills and contaminated soil. PCBs are dissolved in water or absorbed in suspended particles and sediment. Polluted sediment is a long-term source of further water pollution, especially Krupa River and nearby areas.

2.3.4.2.5.1 Pollution of the river Krupa and the close surrounding

Ecological disaster with PCB contamination of the broader area of Semič and Krupa River was a shock in 1983 when they first measured the huge pollution of the karstic spring of the river Krupa, its water and sediments.

Karstic underground and surface waters of the Krupa basin was polluted mainly by drainage and irrigation of PCB from landfills and contaminated soil in the close area, and the direct air emissions into air and technological drainage from the factory. PCBs are dissolved in water or absorbed in suspended particles and sediment. Heavily polluted sediment is a long-term source of further water pollution of the rivers Krupa, Lahinja and Kolpa, and the air from the broader area.

Air transmission is another important way of spreading PCB contamination into the wider area of the River Krupa. PCB concentrations in air directly depend on the quantities of emissions from the production plants, evaporation of PCB from highly contaminated surfaces, soil and water of the river Krupa, and, indirectly, on weather and the transmission processes in the air (diffusion, advection, rinsing, sedimenting). PCB are found in the air as vapours or adsorbed into particles (aerosols).

The main routes of PCB entry into humans and animals in the Krupa contaminated area went through the food chain, from air into plants and animals, and from water/ sediment into fish and aquatic organisms, but also other foodstuff. PCB is brought into plants by the vapours or aerosols. Animals that eat plants or other contaminated food, have PCBs accumulated in their fat tissue. PCB transfer through air is the most important route of entry into plants, particularly for the more volatile low-chlorinated PCBs. Fish and other aquatic organisms accumulate PCB directly from contaminated

water, suspended particles and sediment in water and through the food chain. Although these transmission paths in the contaminated area of Krupa are the most important source of PCB entry into human body (about 80%), intake through drinking water, breathing, and through skin is equally important (20%).

PCBs in the surface water of the river Krupa

Results of regular monitoring show trends of reduced PCB concentrations at the spring of the river Krupa, following the records between 1991 and 2005. Until 2002, the average PCB concentrations did not exceed 0.050 μ g/L, i.e. half the permitted value of PCB concentration in water under the Rules on drinking water quality. In 2005, the average PCB concentrations fell below 25 ng/L.

PCB concentration in the water of the river Kolpa did not exceed the concentration of 20 ng/L until 2002.

PCB in the sediment of the river Krupa

The average PCB concentration measured in the sediment of the Kolpa at present does not exceed 0.2 mg/kg, which is a maximum PCB imission value in soil under the Decree on limit values, alert thresholds and critical levels of hazardous substances into the soil which applies in the RS, regardless of the composition or type of soil.

Measures for cleaning and remediation

Until 1975, about 100 tons of various waste was deposited in various landfills in Semič (mostly at the factory). It contained 60 tons of PCB technical blends. After 1975, the factory started to collect PCB waste and ship it to France for destruction. The inventory of PCB use in the factory from 1962 to 1985 shows that the total quantity of waste released to the environment and other forms of emission was approximately 70 tons (calculated for pure PCB), Table 12.

Table 12: Quantity of emissions of waste PCBs in the environment of the factory in capacitors ISKRA Semič 1962-1984

PCB waste	PCB (kg)
Emissions into air from the technological process:	5,000
Technology sewage spills, loss of manipulation and the like:	5,000
Deposited waste: - Factory-tip, - Sinkholes near the production halls, illegal dumps along the Semič-Štrekljevec road, unknown exported amounts - Other sites: Lokve pri Črnomlju, Mladica, Vranoviči, Roma settlements and dumps and other exported quantities.	 43,000 2,000 15,000
Total:	70,000

Assessment of PCB emissions into the environment during 1962-1985 shows that the largest share of direct contamination was due to emission of evaporated PCB waste from the factory (technological process, leaks, drainage), which could reach up to 1 kg PCB a day. Because of PCB transport by air, the close area of the factory has been so heavily polluted for a long time, the same as the wider area of Bela Krajina (Air $\rightarrow$ Earth $\rightarrow \equiv$ water biological samples).

Based on the extended analyses which confirmed heavy pollution of the River Krupa, the public (especially the civil initiative of local activists from the magazine Razmerja) demanded the rehabilitation of the endangered zone in the period 1983-1984. Because of a technically very demanding problem of PCB pollution of the river Krupa, the Executive Council of the Republic of Slovenia appointed a special commission in November 1984 to coordinate technical work in addressing the pollution of the river Krupa, with the following tasks (RSZS SRS, 1988):

- drawing up provisional guidelines for products containing PCBs
- permanent monitoring of the factory Iskra Semič and its compliance with the ban on the use of water from the river Krupa,
- remediation of landfill with used capacitors,
- control over the consumption of food products,
- monitoring of air pollution, water, soil and biological samples,
- medical monitoring of the Iskra workers and the population,
- prohibition to use water from the river Krupa for drinking, feed, fishing and swimming,
- construction of water supply,
- construction of warehouse with PCB contaminated soil.

During the rehabilitation of soil contaminated with PCB, 18,000 m^3 of soil was excavated and classified into "unclean" and "clean" (less than 10 mg PCB/kg) with on-line measurements. All contaminated soil (referred to as "unclean"), 7000 m^3 in total, was permanently deposited in a special waterproof concrete warehouse. The warehouse was built in 1986 (Figure 8).

Figure 8: Concrete waterproof warehouse in the area of ISKRA Semič Capacitors

The warehouse permanently stores 30,000 kg of PCB waste - the amount which could be collected and physically removed from all the registered sites. The remaining 13,000 kg of used PCB in the immediate environment of the factory

polluted the karstic underground and was (or will) continue (until 2010) to be exposed to natural assimilation processes and transmission to the Krupa springs.

2.3.4.2.6 Other PCB contaminated sites in Slovenia

PCB concentrations in water, air, soil and food in the rest of Slovenia (with the exception of the heavily area of Bela Krajina) are below the maximum values under the Slovenian rules RS and approximately the same rank as average concentrations measured in other western EU member states. The source of this pollution were the previously listed sources of PCB emissions in Slovenia and imissions of trans-border air-borne global PCB contamination in Slovenia.

As regards future operations and environmental measures, PCB monitoring will have to be continued of technology sources in the environment, as well as control and management of used PCB in transformers and capacitors (storage and combustion), respectively, or in the waste, which might contain PCB.
We estimate that by 2003, the majority of used capacitors containing PCB in Slovenia ended in landfill sites or elsewhere in Slovenia with an area of over 20,000 $km^{2.}$ However, PCB from used capacitors as a non-point source means minor, acceptable pollution of water, air, soil and food, and is also the source of trans-border air-borne global PCB contamination. (With the exception of Bela Krajina, PCB concentrations in Slovenia are comparable with the average PCB concentrations in other EU member states as a result of global pollution).

2.3.4.2.7 POPs Waste

In the last three years, the waste management rules were adopted mainly on the basis of the ZVO Act. The basic act governing the sphere of waste is the regulation on waste. It is complemented by three groups of rules. The first group includes the provisions covering various types of waste (for example, management of waste oils, packaging, used packaging, batteries), and the second includes the provisions related to the waste management facilities (disposal, incineration). The third group of rules includes the regulations on trans-boundary transit of waste. Regulations governing waste are listed in Appendix 5.

Monitoring the waste legislation application is the responsibility of inspectors for the environment, and in specific segments, labour inspectors, market inspectors and the customs administration. Duties of liable persons in terms of obtaining administrative acts are listed in the above stated regulations.

Provisions on waste legislation are associated with the legislation governing the trade and the use of plant protection products. Thus, the entities who operate with the PPP, for hazardous waste disposal must have a contract with a collector or disposer who was granted approval by the Ministry of the Environment and Spatial Planning.

Records and Reporting

The list of waste collectors is kept by ARSO which also compiles their annual reports on the quantities of the collected waste and the methods of its processing. The ARSO monthly publishes lists of persons involved in waste management on the

website: www.arso.gov.si (the sphere of waste/data). The ARSO also keeps other records, e.g. the list of producers and acquirers of electrical and electronic equipment, the list of experts producing waste assessment, and the PCB equipment inventory.

2.3.4.2.8 Classification of waste and waste assessment

The Regulation on waste management defines the waste management procedures, the conditions for the collection and transportation of waste, its processing and handling. It also specifies the waste classification list.

Incineration or co-incineration of hazardous waste is allowed only if an assessment is made of their incineration-related properties. The assessment has to be based on the chemical analysis of waste and include all the waste pollution parameters in the Form C of Annex 1 of the Waste Incineration Rules. Sampling of waste and measuring the parameters and other qualities of waste is made in line with the procedures and test methods listed in Annex 2 of the Waste Incineration Rules.

Disposal of waste to a landfill is allowed only if an assessment is made of their disposal-related properties. If the assessment has to be based on a chemical analysis, the latter should include all the waste pollution parameters in the Form C of Annex 4 of the Waste Deposit Rules except those whose quantities are not relevant for reactive processes in the landfill. The analysis should also include other waste pollution parameters if they are relevant for reactive processes in the landfill.

2.3.5 Summary of the POPs production, use and imission in the future - requirements for exemptions

Slovenia will not produce or unintentionally use POPs substances.

2.3.6 The Programme of monitoring POPs, impacts on the environment and human health

In general, programmes of monitoring which include POP compounds, are carried out at the level of control, supervision monitoring, and regular monitoring. Monitoring performed in practice contains the elements of all three basic forms.

Monitoring is implemented for different purposes. Depending on their basic goals, they are divided into four groups:

- establishment of the state (concentration, contents) and trends in the quality of water, air, soil, food and agricultural products, materials and products which come into contact with food,
- establishment of the mass flow rate (load) of pollutants in surface water, air and soil,
- testing compliance with the standards (or specific criteria) for water, air, soil, food and agricultural products, materials and articles in contact with food,
- risk monitoring and establishment of excessive/unacceptable/impermissible load.

The programmes of monitoring POPs substances include:
- basic elements of the environment: air, soil and water (surface standing and running waters, groundwater) presented in Figure 7 as Level I,
- foodstuff, agricultural products, materials and articles coming into contact with food, presented in Figure 1 as Level II.

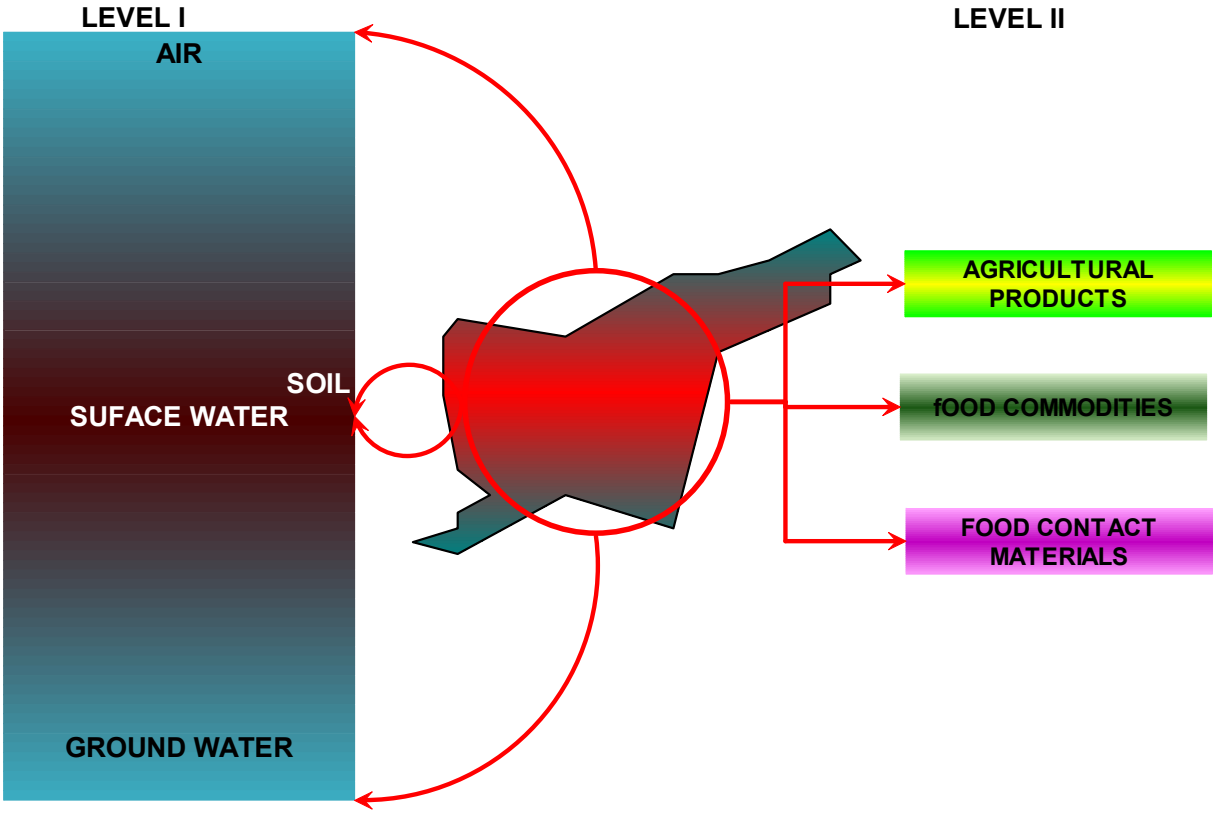

Figure 9: Scheme of environment elements and matrixes associated with POPs monitoring

2.3.6.1 General legal framework

Pursuant to the Environment Protection Act, the responsibilities of the Ministry of Environment and Spatial Planning include monitoring of the environment, and the operation and maintenance of the environmental information system.

Natural phenomena, environmental pollution and contamination are followed-up by environmental monitoring. Monitoring of environmental pollution includes observation and control of imissions into soil, water and air, in flora and fauna, and the health-ecological conditions (imission monitoring). Monitoring of environmental pollution also includes observation and control of emissions into soil, water and air (emission monitoring).

Imission monitoring is applicable for:
- soil, water and air (including noise and radiation): MOP in cooperation with MAFF and the Ministry of Health,
- flora and fauna: MAFF, in cooperation with the MOP,

- health-ecological situation: Ministry of Health in collaboration with the MOP.

The monitoring platform and plan, implementation methodology, required qualification the monitoring operators, the quality of equipment, the required criteria and training certificates, and the methods of regular public information are prescribed by the ministers in line with their powers.

Operational implementation of environmental protection includes risk prevention, reducing the burden on the environment, elimination of environmental damage, and recovery of its regeneration capacity. The objectives of environmental protection also include changes in the production and consumption patterns which help to minimise the use of natural resources and the creation of waste. Equally important is the development and application of technologies to reduce and eliminate pollution, and the use of harmless and biodegradable chemicals and substances which are not liable to bioaccumulate.

Operational monitoring is performed by the responsibility of polluters:
- at individual sources of emissions,
- Imission monitoring as a result of its load in the environment, and if necessary, monitoring of natural phenomena, if they are affected by the polluters' activity.

The entities causing the risk must ensure preventive monitoring in order to avoid excessive burdens or risks to the environment. Polluters must also carry out the required monitoring of the effects of remedial actions.

The ministries keep and maintain an information system of environmental protection. They prescribe the contents, the operators, and keepers of inventories, registers, records and other databases, reporting units, methodologies of collecting, storing, processing and reporting, and their official character and the duty to integrate in the international information systems.

Reporting units stated above are obliged to provide data for the information system of environmental protection in the prescribed manner.

The Government prescribes the structure, the common platform and the degree of aggregated data of the Environmental Information System.

In cooperation with other ministries, the MOP drafts reports on the environmental situation in the Republic of Slovenia. The reports are discussed and approved by the National Assembly. Following its adoption, the report is made known to the public.

The basic legal acts govern the work of the Ministry of the Environment and Spatial Planning and the Ministry of Health in the field which directly or indirectly involves POPs compounds. Annex 5 lists the RS acts associated with the POPs substances.

Legal bases governing the operation of the Ministries in the field of monitoring

Ministry of the Environment and Spatial Planning	Ministry of Health
Constitution of the RS Government of the RS Act (OG RS, No 4/93, 23/96, 47/97, 119/00, 30/01, 52/02, 123/04, 24/05)	Constitution of the RS Government of the RS Act (OG RS, No 4/93, 23/96, 47/97, 119/00, 30/01, 52/02, 123/04, 24/05)

Ministry of the Environment and Spatial Planning	Ministry of Health
Public Administration Act (OG RS, No 52/02, 110/02, 56/04, 83/03, 61/ 04, 97/04, 123/04, 24/05, 93/05) Organization and Competence of Ministries Act (OG RS, No 71/94, 47/97, 30/01) Environmental Protection Act (Uradni list RS, No 39/06-ZVO-1-UPB1, 49/06-ZMetD, 66/06-odl. US and 33/07-ZPNačrt; 70/08-ZVO-1B) Nature Conservation Act (OG RS, No 56/99, 31/00, 119/02, 22/03, 41/04, 96/04); Waters Act (OG RS, No 67/02, 2/04, 10/04, 41/04); National Environment Protection Action Programme (OG RS, No 83/99; 41/04; 2/2006).	Public Administration Act (OG RS, No 52/02, 110/02, 56/04, 83/03, 61/ 04, 97/04, 123/04, 24/05, 93/05) Health Care and Health Insurance Act (OG RS, No 9/92, 13/93, 9/96, 29/98, 6/99, 99/01, 60/02, 20/04, 62/0,76/05) Resolution on National plan of health care 2008-2013 "Satisfied users and performers of medical services" (OG RS, No 72/2008 (74/2008 corr.)) Health Inspection Act (OG RS, No 99/99, 107/99, 36/04, 47/04) Chemicals Act (OG RS, No 110/03, 47/04, 16/08) Cosmetics Act (OG RS, No 66/00, 47/04) Act Regulating the Sanitary Suitability of Foodstuff, Products and Materials Coming into Contact with Foodstuffs (OG RS, No 52/00 and 42/02, 47/04) Strategic Materials Act (OG RS, No 29/06) National chemical safety programme (OG RS, No 119/06)

Details of the organization and operation of MOP can be found at the website of the Ministry of the Environment and Spatial Planning (http://www.mop.gov.si/) and the Ministry of Health (http://www.mz.gov.si/).

Figure 10 shows the vertical structure (which means the organization of monitoring for the same ministry and the various environmental elements or investigated /monitored matrixes) and the horizontal structure (different ministries and the same element of the environment or the same investigated/monitored matrix). Monitoring is carried out by accredited providers, government institutions (ARSO) and public institutions of the RS.

The bases for assessing the measured values (measurement results) are the limit values set by the current national regulations, EU documents and reference sources (e.g. US EPA standards, *Codex Alimentarius Commisison* - WHO documents). Assessing the results of monitoring is normally carried out by government institutions in cooperation with expert bodies (mostly in collaboration with monitoring operators).

The results of monitoring are valued according to:
- Limit or guide values in the applicable regulations of the RS, EU documents and the representative reference sources, and
- Trends over time and space (e.g., based on models: Towards the Derivation of Quality Standards for Priority Substances in the Context of the Water Framework Directive, Final Report of the Study Contract No. B4-3040/2000/30637/MAR/E1, Identification of quality standards for priority substances in the field of water policy,

Peter Lepper, Fraunhofer-Institute Molecular Biology and Applied Ecology, May 2002).

Reporting the results of monitoring and public information is transferred from the "paper" form of annual reports to the websites of the ministries or governmental institutions.

MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING (MOP)					MINISTRY OF HEALTH (MZ)				MINISTRY OF AGRICULTURE, FORESTRY AND FOOD (MKGP)			
ENVIRONMENTAL AGENCY OF THE RS (ARSO)					HEALTH INSPECTOR OF THE RS (ZIRS)			CHEMICALS OFFICE (URSK)	INSPECTORATE FOR AGRICULTURE, FORESTRY AND FOOD (IRSKGH)			VETERINARY ADMINISTRATION OF THE RS (VURS)
EMISSIONS - AIR (OPERATIONAL MONITORING)		IMISSIONS - AIR			food, food additives and products and substances that come into contact with food: - trade - imports	BATHING WATER:	POTABLE WATER: PUBLIC SUPPLY, BOTTLED WATER	CHEMICALS (HAZARDOUS SUBSTANCES)	MINERAL WATER, SOURCE WATER, TABLE WATER	AGRIC. PRODUCTS	LOAD ON SOIL	FOODSTUFF OF ANIMAL ORIGIN
- LOADS, - LEVEL OF HAZARDOUS SUBSTANCES, - SEWAGE METHODS		- POLLUTION			Wholesomeness, SAFE USE	Whole-someness	Whole-someness	LEVEL OF HAZARDOUS SUBSTANCES	CERTIFICATION, PRODUCTION, QUALITY	PRODUCTION FIRST TRADE WITH AGRICULT. PRODUCE	PRODUCTION	PRODUCTION, IMPORTS, TRADE
	EMISSIONS - waste management (operational monitoring)	IMISSIONS - the quality of surface water	IMISSION - loads on soil									
emissions - waste water (operational monitoring)	content of hazardous substances, arrangements for the collection, transmission, transport, removal	- chemical status of lakes - supply of drinking water, - water for freshwater fish species - water for the life of marine shells, ...	introduction of hazardous substances and nutrients, Endangerment status due to PPP	imission - quality of ground water								
- load due to compounds of carbon, nitrogen and phosphorus - content of hazardous substances - methods of collecting, discharge, cleaning				chemical state, endan-germent								

Figure 10: The Scheme of the vertical and horizontal organization of monitoring in Slovenia

2.3.6.2 Planning of monitoring

The Scheme of planning and implementation of monitoring has changed recently, gaining the formats and contents as defined in the EU documents. The schemes of planning and implementation differ among each other and there is no uniform model. Among other things, they depend on the rules which serve as a basis for the implementation of monitoring.

The Programme of monitoring is planned and implemented in stages, which are presented as a common example in Figure 11. The scheme applies to observational monitoring, monitoring of official controls, and monitoring of the situation in the environment. There is no single model for planning and implementing the programme of monitoring in Slovenia nor worldwide. The bases for planning and implementing the monitoring programmes are legal acts; they are therefore drafted by government institutions within individual ministries (e.g. Environment Agency of the RS prepares, based on the Environmental Protection Act, the environmental elements of the programme: air, groundwater, surface water and soil), or in cooperation with expert institutions.

The programmes of operational monitoring (e.g. the air emissions into air or waste water emissions) are set out in regulations for all the phases of the programme. Its implementation is the responsibility of liable persons; the operational monitoring is performed by authorized or designated implementing institutions.

Figure 11: General scheme of planning and implementation of monitoring in Slovenia

The bases for planning the programmes of monitoring include:

(1) Legal acts of the RS listed in Annex 5 determine, for individual compounds and/or groups of compounds, the following items:

- procedures and criteria for measuring the imission and emission quantities,
- procedures and criteria for assessing the measured imission and emission values,

- procedures and criteria for setting ecological fees for those who have caused excessive load considering the measured emission values,
- procedures for handling the substances which contain a compound or a group of compounds belonging to the POPs group,
- data reporting procedures for the entities who caused the exposure to POPs compounds,
- procedures for informing the public about the exposure of the environmental elements to POPs for those who caused these loads.

(2) EU documents.

(3) Other international documents (for example, interstate agreements on the implementation of Quality Monitoring international watercourses with Slovenia Hungary, Austria, Italy and Croatia).

2.3.6.2.1 Overview of the natural elements of the environment and monitoring involving POPs substances

The monitoring programmes, currently implemented in Slovenia, include POPs as defined in RS regulations (Annex 5) and in the EU documents.

The existing legislation on the monitoring covers the following elements: air, water, soil and waste. The legislation also sets certain obligations related to information, education, awareness raising, cooperation and training, and defines the executive bodies and institutions, and the conditions for meeting these obligations.

Slovenia performs imission and emission monitoring (usually implemented as operational monitoring) of groundwater, surface water and air pollution, mostly since 1986, which also include compounds from the group of persistent organic pollutants.

Table 13 shows the inclusion of individual POPs compounds or groups of POPs compounds in the programmes of monitoring.

Table 13: Individual compounds or compounds of POPs and programmes monitoring in RS

POPs	Air		Water				Soil	Waste	Foodstuff		Materials coming into contact with food
	Emissions	Imissions	Groundwater	Surface water	Potable water	Waste water			Plant origin	Animal origin	
Aldrin			o	o	o		o	o	o	o	
Chlordane			o	o	o		o	o	o	o	
Dieldrin			o	o	o		o	o	o	o	
Endrin			o	o	o		o	o	o	o	
Heptachlor			o	o	o		o	o	o	o	
Hexachlorobenzene			o	o	o	o	o	o	o	o	o
Mirex											
Toxaphene											
DDT + derivatives			o	o	o		o	o	o	o	o

Polychlorinated biphenyls (PCB)	o	oo	o	o	o	o	o	oo	o	o	o
(PCDD/PCDF)	o	o					o	o		o	

Air

Monitoring of air pollution in the living environment is regulated indirectly by the operational monitoring that the liable persons have to perform in line with the national regulations in force.

Data on the incidence of compounds from the group of persistent organic pollutants in the air are becoming representative in the course of operational monitoring, both in terms of time and geographic location.

Annual reports on the state of air pollution in Slovenia

Emission inventories are data collected and presented according to the methodology on the emissions of individual substances. Data serve as a basis to present the situation of air pollution and for a rational planning of air quality. In addition, the states are obliged to report emission data in the form and scale imposed by international obligations. Until 2010, individual substance will have to be reduced to precise maximum values in line with the European norms.

Emissions are calculated according to methodologies which comply with the reporting requirements. The CORINAIR methodology (CORE Inventory of AIR emissions) is a single European programme and methodology for collecting and computing data, and to present the emissions of hazardous substances into air.

Specified harmful substances include POPs, among others PCB, D/F, HCH and HCB.

Since 1992, Slovenia is included in the European programme for the management of emission inventory (CORINAIR) and exchange (reporting) of emission data with the EU. A Slovenian regulation for keeping the records on emissions is underway; it will define the collection of input data and computing the emissions, and a database used for reporting on the emissions for various purposes.

The following input data are used for the production of emission inventories:

- Statistical Yearbook of the Energy Economy of the RS,
- Statistical Yearbook of the RS Statistical Office,
- results of the survey - annual review of the industry,
- emission register of stationary sources of pollution (REMIS), based on annual reports on emissions.

Emissions of substances which are computed at the country level are divided into 11 main categories of sources (SNAP 1), among them, in terms of envisaged emissions for 2005 and 2010, also POPs (PCB, D/F, HCH and HCB) – for the year 1990 and for the period 1994-2000.

According to the Decree on the emission of substances into the atmosphere from combustion plants, used flammable liquids can be used as fuel, if they contain up to 10 mg of polychlorinated aromatic hydrocarbons (such as PCBs) per kg of combustible liquid with a calorific value at least 30 MJ/kg, and do not cause higher

emissions of individual inorganic substances and their compounds than the maximum emission values set out in Annex 2 of this Decree, and only upon special approval (in line with the waste management regulations).

Groundwater, surface waters and drinking water

Basic information on the burden of the aquatic environment is generated within the monitoring of surface waters and the groundwater, respectively. In the future, reports will include data on the loads of water and sediment of stagnant surface waters (natural and man-made lakes) and the coastal seas, brackish water and shell beds.

The programme of monitoring the quality of surface water includes measurements of aldrin, dieldrin and endrin, DDT isomer (p, p-DDT, o, p-DDT, p, p-DDE, o, p-DDE, p, p-DDD and o, p-DDD), HCB, and HCH isomers (α-HCH, β-HCH, γ-HCH and δ-HCH). The content of HCB and HCH is determined also in the sediment up to 15 cm deep. The number of measurement points, their geographical distribution and frequency of sampling changed over the years and is adapting to the needs and specific problems of individual parts of the water stream. Listed substances are sampled once or twice a year. The results of monitoring the imission into surface waters are presented in tables below.

Soil

The programmes of exploring soil and plants carried out in Slovenia in the years 1991/1998 and 1999/2001 can be classified as imission monitoring in terms of their planning, organization and implementation. With the proposed EU legislation on soil load from pollutants, the already completed analyses can be viewed as initial monitoring of soil loading.

Foodstuff

In Slovenia, there are some ongoing programmes of testing foodstuff and agricultural produce on the market. They can be considered as imission monitoring in terms of planning, organization and information. However, due to the EU organization and for the purpose of controlling the exposure of the local people to hazardous materials, they are generally classified as monitoring with different kinds of action or performance. These testing also include compounds or groups of POPs such as organochlorinated pesticides with the aim to:

- monitor the presence of pesticides whose use in foodstuff is banned (improper use of pesticide formulations),
- monitor the presence of prohibited pesticides in foodstuff which result from an environmental accident or the impacts of a degraded environment.

Analyses of food of plant and animal origin are carried out in line with the provisions of the rules in force in the RS and the EU documents. The analyses are performed:

- in the primary agricultural production - foodstuffs originating in Slovenia,
- on the market - food originating in Slovenia and the EU countries
- upon the entry of food from the EU countries and the import from the third countries.

The compounds of the group POPs included in the programme of testing include:

- the group of organochlorine pesticides (aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene),
- polychlorinated biphenyls (PCB),
- DDT and derivatives DDD and DDE,

- polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF).

Further information on the food monitoring is available on the following websites:

- food of animal origin in the production and import; http://www.vurs.gov.si/,
- agricultural products; http://www.furs.si.

Effluents

Analyses of the content of certain compounds, or groups of compounds from the POPs group in effluents are performed in line with the provisions of the regulations applicable in the RS. They are executed as operational monitoring which is mandatory for all liable persons who charge waste water with hazardous substances, including certain POPs compounds, or groups of compounds.

The compounds from the POPs group included in the programme of testing are PCB.

Waste

Decree on waste management determines the methods of waste management, the conditions for the collection and transportation of waste, its processing, recovery and disposal. It also specifies the list of waste and hazardous waste by categories, and a set of limit values by branches of industry prescribed by the operational monitoring.

Analyses of the content of certain compounds, or groups of compounds from the POPs group in waste are performed in line with the provisions of the regulations applicable in the RS (Annex 6). They are executed as operational monitoring which is mandatory for all liable persons pursuing the activities likely to generate waste which is assessed as hazardous waste because it contains hazardous substances (among others, certain POPs compounds, or groups of compounds from the POPs group).

The compounds of the group POPs included in the programme of testing include:

- the group of organochlorine pesticides (aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene),
- polychlorinated biphenyls (PCB),
- DDT and derivatives DDD and DDE,
- polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF).

2.3.6.2.1.1 Situation in the environment established by regular monitoring of POPs as pesticides

Distribution of pesticides with POPs substances in the environment depends on the physical-chemical properties of individual compounds (various types, technical blends and their compounds) and the characteristics of the environmental elements like groundwater, surface water, air and soil. POPs substances travel from one element of the environment into the other in various, mostly uneven processes with different dynamics.

The description of the pollution of surface watercourses, groundwater and sources in Slovenia, in terms of POPs content, is based on the monitoring of the MOP (ARSO). Since 2002, new or reorganized programmes of monitoring water were put in place in line with the provisions of the RS laws, namely:

a) national monitoring of the water quality in the bathing water areas,
b) monitoring of the quality of lakes,

c) monitoring the quality of water for the life and growth of shellfish and marine gastropods
d) monitoring the quality of water supporting fresh-water fish life,
e) monitoring the quality of surface water which is taken for public water supply.

Data are taken from the period 1986 to 2002, Table 14. They are aggregated, and the table also lists the areas exceptionally loaded with the POPs group compounds.

Basic information on the burden of the aquatic environment is generated within the monitoring of surface waters. In the future, reports will include data on the loads of water and sediment of stagnant surface waters (natural and man-made lakes) and the coastal seas, brackish water and shell beds in line with the provisions of RS:

- Decree on the chemical status of surface waters (OG RS, No 11/2002, 41/2004),
- Decree on the quality required of surface waters supporting fresh-water fish life (OG RS, No 46/2002, 41/2004),
- Decree on the quality required of water supporting marine bivalves and gastropods (OG RS, No 46/2002, 41/2004),
- Decree on the quality of underground water (OG RS, No 11/2002, 41/2004).

The table below shows the load of groundwater and surface waters with pesticides (POPs). In the period 1986 to 2002 which is the source of data on the burden of groundwater and surface waters with POPs the methodology of analysing water and sediment was developed (from sampling to chemical analyses).

The presence of POPs substances in drinking water from the systems of public water supply has not been established, therefore this information is not presented separately.

Table 14: Overview of pesticides with POPs substances in groundwater and surface water in the period 1986-2002

Environmental element	Organochlorine compounds	DDT and derivatives	Loaded area or section of the water stream	Description of trends
Surface waters-water	In 90-ies:continuous presence at certain sections of surface water; since 2002, the measured values are within the limits defined for the analytical methods applied.	Before 1986: occasional presence in traces; since 2002, the measured values are within the limits defined for the analytical methods applied.		
Groundwater	In 90th years of continuous presence in the individual sampling points; since 2002, the values are within the limits defined for the analytical methods applied.	In the 90-ies: occasional presence in traces at certain sampling points; since 2002, the values are within the limits defined for the analytical methods applied.	Individual sampling sites. With the modern network of sampling points, the number of established cases of POPs compounds decreased to the amounts with no statistical relevance.	Considering the established load, the assessment of trends is not applicable.

Surface waters in Slovenia

Data for surface waters and Slovenia are summarized for the period from 1986 to 2002. POPs substances in pesticides occur in traces and do not constitute pollution

of watercourses with these compounds. The highest concentration of each pesticide in water does not exceed 10% of the value permitted under the Rules on the wholesomeness of drinking water.

Groundwater in Slovenia

The results of analyses of groundwater in Slovenia for the period 1987-2002 indicate that groundwater is not loaded by pesticides with POPs substances (Table 15). The table covers only pesticides which occurred in certain seasons in the concentrations higher than the prescribed limits.

Table 15: Pesticides with POPs in the groundwater in the period 1987 to 2002

M	Aldrin	Endrin	Dieldrin	Heptachlor	HCB
Number of data N	30	16	20	26	16
$X_{CENTRAL, SUM}$ (ng/l)	2	2	8	2	2
$X_{50PERCENTILE, SUM}$ (ng/l)	2	1	2	2	2
$X_{MAXIMUM, SUM}$ (ng/l)	5	11	64	5	3

Table 16 provides data without any indication of the site "Brunšvik Fountain" where local pollution is found. The presence of other pesticides with POPs (e.g. DDT and derivatives) has not been established in groundwater.

Table 16: Pesticides with POPs in groundwater at the sampling site Brunšvik, Drava plain, in the period 1987 to 2002

M	Aldrin	Endrin	Dieldrin	Heptachlor	HCB
Number of data N	1	15	22	0	0
$X_{CENTRAL, SUM}$ (ng/l)	3	52	110	0	0
$X_{50PERCENTILE, SUM}$ (ng/l)	3	24	80	0	0
$X_{MAXIMUM, SUM}$ (ng/l)	3	213	310	0	0

Water sources

Monitoring pesticides in water sources was carried out with the focus on organochlorinated pesticides: aldrin, dieldrin, endrin, DDT residues and its metabolites.

According to the analyses of water sources performed in the period 1990 to 2001, the pesticides with POPs do not constitute a source of contamination. Endrin occurs only in one sampling point (Mrzlek), where endrin concentration was 0.003 μ g/l in 1990.

Soil

Until 2002, the soil as a component of the environment was included in projects with a common purpose to define the methodology of monitoring (from planning to implementation). The existing data on soil load with POPs substances are therefore obtained in the context of project tasks (Table 17). Based on the methods of obtaining data, they can serve as results of monitoring the burden on the soil with hazardous substances (including POPs).

The monitoring programme involved the analyses of organic compounds, such as chlorinated pesticides (aldrin, dieldrin, endrin, heptachlor, heptachlorepoxide, forms of HCH, HCB, p, p' DDT, p, p' DDE, o, p' DDD and p, p' DDD).

Table 17: Overview found the presence of pesticides that are POPs and soil

Environmental element	Organochlorinated compounds	DDT and derivatives	Load area	Description of trends
Ground	The presence of compounds at some sampling points but not exceeding the limit imission value.	The presence of compounds at some sampling points which exceeded the limit imission value. (0.1 mg/kg for the sum of DDT, DDD and DDE).	DDT and derivatives: some sampling points at Dravsko polje.	DDT and derivatives: trends cannot be described, because the soil monitoring is not performed. Some analyses performed for other reasons show that there are occasional traces of DDT and derivatives, but without any statistical significance for the monitoring of trends.

The results of soil pollution with persistent organic pollutants in Slovenia are taken from the report "Monitoring of soil and vegetation pollution in Slovenia for 1991" and the report "Surveys of soil contamination with a draft programme of emergency repair measures for the year 1999".

The programme of monitoring the soil pollution in Slovenia (1991) involved analyses of chlorinated pesticides: aldrin, dieldrin, endrin, heptachlor, heptachlorepoxide, forms of HCH, HCB, p, p' DDT, p, p' DDE, o, p' DDD and p, p' DDD. The limit of determination (LOD) or quantification (LOQ) for the individual pesticide is 2 μ g/kg or 5 μ g/kg. In 1991, this programme included five Slovenian areas: Ljubljana, Ptujsko polje, Koper, Krško polje and Jesenice.

Two sampling points in Ljubljana were outstanding in terms of pollution with p, p' DDT with comparable concentrations (325 μ g/kg and 447 μ g/kg), and one in Krško polje with a concentration of 265 μ g/kg.

The programme of monitoring the soil pollution in Slovenia in 1999 involved analyses of chlorinated pesticides: aldrin, dieldrin, endrin, heptachlor, forms of HCH, HCB, o, p' DDT, p, p' DDT, o, p' DDE, p, p' DDE, o, p' DDD and p, p' DDD. The limit of determination (LOD) or quantification (LOQ) for each pesticide was 0.001 mg/kg. In 1999, three Slovenian areas were included in the programme.

It was found that the total concentrations of DDT and metabolites do not exceed the limit values under the Regulation on limit, warning and critical imission levels of hazardous substances in soil applicable in the RS regardless of types of soil. The exception is the measurement point from Dobovec and Trbovlje with the exceeded concentration of 0.19 mg/kg.

Foodstuff

Until 2007, no contamination was established of foodstuff of animal or plant origin that would contain compounds or groups of POPs compounds exceeding the limit values specified in the applicable regulations of the RS or the EU documents.

Animal feed

Monitoring the PPP (the levels of POPs, PCB and dioxins/furans) in animal feed is governed by the Veterinary Practice Act and the Animal Feed Act. According to the *'Rules on health suitability conditions to be met by straight feedingstuff, compound feedingstuff, premixes and feed additives'*, animal feed which contains pesticides and dioxin is unsuitable. The Rules resume the EU Directive 2002/32/EEC on undesirable substances in feed. The Authorities controlling the feed are VURS and IRSKGH. Each year, they prepare a joint surveillance programme, which includes the residues of pesticides and dioxins.

The programme of target sampling defines the frequency of analyses, the choice of matrix, and the sampling points.

In the years 2002, 2003, 2004 no positive samples of feed were recorded.

In the case of positive results, the prescribed measures are applied. The inadequate samples are reported through the RASFF system.

The programme of monitoring pesticide residues in foodstuff and agricultural products of plant origin

The competent authorities for the control of residues in foodstuff and agricultural products are the Ministry of Health and the Ministry of Agriculture, Forestry and Food, i.e. their supervisory authorities ZIRS and IRSKGH.

In the process of risk assessment, the competent inspectorates keep each other informed of the results of chemical analyses, in line with their mandate in the field of foodstuff. Inspection work in this area is planned based on reports of the previous period and envisaged risks for human health. Inspections can be carried out according to that plan; they may be random or targeted.

The objective is to cover, by the annual programme of monitoring pesticide residues in food, as many types of food as possible that is available for Slovenian consumers. The major part of the programme varies from year to year and is performed in the form of modules covering:

- the main groups of foods such as fruits, vegetables, cereals and cereal products, food of animal origin,
- the module following the guidelines of the coordinated EU programme of monitoring - usually involving a specific type of fruit and vegetables
- a special module which includes processed foods, for example baby food.

Part of the annual programme includes standard food in Slovenia: potatoes, lettuce, apples and milk. In planning this module, the following is taken into account:

- Information regarding the occurrence or presence of pesticide residues in food produced within own programmes from the previous years, and the programmes of other EU member states,
- annual EU recommendation for coordinated programme of food analysis as to the pesticides contents,
- Capacity of test laboratories concerning the existing metering technology and validation of test methods.

In the field of customs control of cross-border traffic, no specific actions have been carried out so far. Until 2003, CURS has not recorded any rejection of goods or

further inspections. The reports of controls carried out found no irregularities in this regard.

The programme of monitoring pesticide residues in food of animal origin and feed

The control of the levels of residues of pesticides in food of animal origin originating from domestic production or imports is performed by VURS and IRS, each within their respective competences.

VURS exercises the programme of monitoring residues of veterinary medicines and other harmful substances in foodstuffs of animal origin within the mandatory regulatory controls imposed by Directive 96/23/EC.

Control of substances and residues of harmful substances in live animals and animal products is carried out with a view to:

a. detect any illegal use of substances and preparations,
b. control of the compliance of residues of veterinary medicines with the maximum levels of residues, and pesticide residues with the maximum levels set by the national regulations on environmental pollutants,
c. control and identify the causes of residues in foodstuffs of animal origin.

The substances in Group B include: organochlorinated compounds, including polychlorinated biphenyls, organophosphorus compounds, chemical elements, micotoxins, colours and other. The purpose is to verify compliance with particular maximum residue limits (MRL) in veterinary medical products listed in Annexes I and III to Regulation 2377/90/EEC, and maximum allowed levels of pesticides listed in Annex III of Directive 86/363/EEC, and monitoring the concentration of pollutants from the environment which include POP substances.

The number of samples and matrixes are in line with the programme of monitoring residues of harmful substances for the current year and in line with the programme of monitoring the feed and potable water for animals on the list (Annex 9) according to national and EU regulations.

VURS reports positive results of POPs in the food of animal origin to the MZ and the MOP, and to the EU in its annual reports. It informs the public on individual cases of residues of harmful substances in food of animal origin and provides information to the consumers' association for their research on the state of the market.

Sampling within the framework of monitoring is targeted and performed in line with the sampling strategies and the programme of feed control and monitoring.

2.3.6.2.1.2 State of the environment concerning PCB

Distribution of PCB in the environment depends on the physical-chemical properties of PCBs (individual types, technical blends and their compounds) and the characteristics of the environmental elements like groundwater, surface water, air and soil. PCBs (and other compounds from the PCB group) travel from one element

of the environment into the other in various, mostly uneven processes with different dynamics.

Description of the state of pollution of surface waters, groundwater and water sources of Slovenia regarding the PCB content is the same as for POPs (pesticides); it is made on the basis of information from monitoring (MOP, ARSO).

Based on the information on the PCB contents in the underground and the surface water for the period 1986 – 2002, Table 18 quotes the areas that deviate in terms of exposure to POPs substances.

Data on the burden of the aquatic environment are obtained from the monitoring of the surface waters. In the future, reports will include data on the loads on water and sediment of stagnant surface waters (natural and man-made lakes), coastal seas, brackish water and shell beds in line with the provisions of the RS regulations.

The text below presents the load of groundwater and surface water with PCB for the period 1986 to 2002, when the methodology of analysing water and sediment on the PCB contents was being developed. Aggregated results of analyses are therefore presented below.

The presence of compounds from the POPs group has not been established in the public drinking water supply, therefore data on the PCB values in potable water have not been presented.

The Programme of monitoring included six representatives of polychlorinated biphenyls (PCB 28, 52, 101, 138, 153, 180). Throughout the period of monitoring, the number of sampling did not change significantly. The dynamics and sampling frequency depended, among other, also on the available funds. The Programme of monitoring included representative sampling points:

(1) on the largest surface waters in Slovenia (the rivers Drava, Sava with tributaries Sora, Kamniška Bistrica and Ljubljanica; Savinja, Krka and Sotla),
(2) the water streams within the area of emission sources of PCB (the river Kolpa with tributaries Lahinja and Krupa)
(3) in the streams with the geographical area of karstic geological bases, which are exploited for the supply of potable water (karstic streams and the basin of Ljubljanica; Soča River with its tributaries Idrijca and Vipava, and Hublej exploited as water supply; the river Rižana also exploited for water supply).

The programme of monitoring includes the analyses of water and sediment.

The measured levels of PCB in water were used, until the issue of the Decree on the chemical status of surface waters, in line with the regulations on public drinking water supply.

The measured values should be assessed with reference to the limit value of 0.01 μg/l for the sum of the measured levels of these congeners defined in the Decree on the chemical status of surface waters, Decree on the quality required of surface

waters supporting fresh-water fish life, and Decree on the quality of surface water taken for the drinking water supply. (OG RS, No 46/2002, 41/2004),

Table 18: Overview of the presence of PCB in the underground and surface water

Environmental element	PCB	Exposed area or section of the watercourse	Description of trends
Surface water	The measured levels after 2002 are lower than the limit of quantification for the applied analysis method. The findings indicate that the spring of Krupa occasionally contains PCB in water as a result of the release of bound PCB into the sediment of the Krupa.	PCB: the area of surface waters Krupa - Lahinja-Kolpa.	PCB loads of water and sediment is reduced. In Krupa as the main source, PCB is found only occasionally.
Groundwater	In the 90-ies: continuous presence at certain sampling points, after 2002: the levels measured within the quantification limit for the analytical method applied.	Individual sampling sites. With the modern network of sampling points, the number of established cases of PCB compounds decreased to the amounts without any statistical relevance.	Given the observed load, the assessment of trends is not applicable.

The limit of determination or the limit of quantification for PCB in water between 1986 and 2002 was 0.001 μ g/l to 0.1 μ g/l and in sediment from 1 μ g/kg to 5 μ g/kg.

Surface waters of Slovenia from 1986 to 2002

The system of monitoring surface waters in Slovenia (water and sediment) in the given annual period involved 39 surface waters of Slovenia. The number of sampling points in this period was around 81, and in certain surface waters (for example Sava), the sampling programme was performed at two or more sites.

Results of analyses of surface waters in Slovenia in the said period show PCB loads mainly PCB in water was occasionally found also in other surface waters, especially in 1989.

Table 19: PCB content in surface waters of Slovenia in the period 1986-2002

M	"Source of the Krupa → Lahinja → Kolpa"	Other surface waters
Number of data N	28	30
$X_{CENTRAL, total}$ PCB (ng/l)	12	36
$X_{50PERCENTILE, total}$ PCB (ng/l)	2	16
$X_{MAXIMUM, TOTAL}$ PCB (ng/l)	180 (Mura River, sampling Ceršak, year 1989)	370 (1991)

The results of sediment analyses in surface waters of Slovenia in the said period show that the sediment in the Krupa River source is particularly laden with PCB. Consequently, the sediment in the river Kolpa (water system "Source of the Krupa → Lahinja → Kolpa"), Table 20. The presence of PCB in the sediment was occasionally also found in other surface waters, in particular during the period 1997-1999.

Table 20: PCB sediment of surface waters of Slovenia between 1986 and 2002

M	Source of the river Krupa	River Kolpa	Other surface waters
Number of data N	27	16	15
$X_{CENTRAL,\ total}$ PCB (ng/l)	2.2	0.028	0.006
$X_{50PERCENTILE,\ total}$ PCB (ng/l)	1.1	0.024	0.007
$X_{MAXIMUM,\ SUM}$ PCB (ng/l)	10 (June 1994)	0.077 (May 1999)	0.009 (1997, Cerkniščica, sampling Dolenje jezero, 1999, Mura, sampling point Ceršak)

Table 21: Maximum concentration values of PCB in the contaminated river Krupa in the period 1982-1986

Sample	Degree of pollution	Standards
Air	1 to 10 μ g.m $^{-3}$	1 μ g.m $^{a\ -3}$
Water	100 - 1000 ng.dm $^{-3}$	1 ng.dm $^{-3\ b}$
Sediment	10 - 800.mg.kg $^{-1}$	--
Soil	10 - 100 μ g.kg $^{-1}$	--
Milk	1 - 5.mg.kg $^{-1}$	1.5 mg.kg $^{-1}$ (fat) ^{c}
Eggs	1 - 10.mg.kg $^{-1}$	0.3 mg.kg $^{-1}$ (whole) ^{c}
Fish	1-200 mg.kg $^{-1}$	2.0 mg.kg $^{-1}$ (edible part) ^{c}
Poultry	1 to 20 mg.kg $^{-1}$	3.0 mg.kg $^{-1}$ (fat) ^{c}
Human adipose tissue	1 to 10 mg.kg $^{-1}$	--

Notes: a) NIOSH; b) EPA c) FDA

Groundwater in Slovenia

In the period from 1986 to 2002, the system of monitoring groundwater in Slovenia included 19 groundwater pools with about 158 sampling points.

The results of investigations of groundwater in Slovenia during that period indicate that groundwater has not been charged with PCB. Exceptions are certain sampling points with typical micro-level sources of pollution.

Water sources

The system of monitoring water sources of Slovenia included 79 sampling points. Data cover the period 1990-2001. PCBs were present only at three sampling sites. In the remaining samples, the PCB concentration was below the limit of quantification, therefore, except at the sampling point "Source of the Krupa" PCB does not represent a significant burden (Table 22).

Table 22: PCB content in water sources of Slovenia for the period 1990 to 2001

M	Year of sampling	$X_{MAXIMUM,\ SUM}$ PCB (ng/l)
Source of the river Krupa	1993	165
Vrhniški Obrh	1992	3
Podroteja	1990	7

Drinking water

The presence of PCB has not been established in drinking water from the systems of public water supply.

Soil

In the period until the year 2002, soil, as an important element of the environment, was included in project tasks with a common purpose to define the methodology of monitoring from planning to implementation. The existing data on soil load with PCB are therefore obtained in the context of project tasks (Table 23). Based on the methods of obtaining data, they can serve as results of monitoring the burden on the soil with PCB.

Table 23: Overview of the PCB presence in soil

Environmental element	PCB	Laden area	Description of trends
Ground	Compounds found in sampling points, but not exceeding the imission limit value (0.2 mg/kg for the total of PCB 28, 52, 101, 118, 138, 153 and 180). Exceptions are the analyses carried out in the area of Semič. Analyses were conducted as a monitoring.	PCBs: results of individual analyses show that the soil in the area Semič is laden with PCBs.	PCB: Geographic scope and the degree of load in the Semič area are unknown; assessment of trends is not possible.

Waste

PCB content in waste is analysed in the context of operational monitoring performed in line with the regulations by the persons liable to carry out operational monitoring. In the time of drafting this report, no PCB values were found to exceed the PCB limit values defined by the law of the RS. Detailed information on the results of operational monitoring is available online at: http://www.arso.gov.si/varstvo% 20okolja/odpadki/.

2.3.7 Definition of health care system in Slovenia

The primary concern of every public health care system is to safeguard health of the country's population. Preventive health-care measures aimed at protecting the population against harmful substances in the environment are based on a complex set of activities and measures to diminish the risk.

POP substances in the environment pose considerable risk to human health. Consequently, protection of the citizens of the Republic of Slovenia against harmful effects of POPs is an important task of the Slovenian public health-care system. Activities and measures to decrease the risk to human health include the following:

- Assessing the effect of harmful substances on human health,
- Identifying the ways of exposure of the population to risk factors,
- Assessing the level of burden on the population,
- Risk analysis – risk assessment, risk management and risk communication,
- Identifying and planning the types and scope of measures to reduce health risk, and studying the efficiency of the measures taken,

- Communicating to the general and professional public the information about the effect of harmful substances in the environment on human health and about safe conduct and lifestyles to decrease the risk of exposure to these substances.

For successful execution of the above stated activities, cooperation among all the competent sectors is essential.

Research into the correlation between environmental factors and human health, and related interpretations provide a scientific basis for understanding the ways specific environmental factors affect human health. Knowledge of toxicological characteristics of individual substances is important to the development of a strategy for reducing the impact of potentially harmful effects on human health.

To achieve a high level of human health and environment protection, it is necessary to encourage more efficient implementation and enforcement of the relevant legislation. Wherever possible, regular reporting and monitoring of the implementation of the legislation, and of the application of health-care and environmental indicators is needed. Strengthening of the role of inspection services and other surveillance authorities responsible for establishing a system of environmental and health-care accountability, training and public communication is a priority task.

In the Republic of Slovenia, the health care and health insurance system is regulated by the Health Care and Health Insurance Act (Official Gazette of the RS, No. 20/04). The Act identifies the parties responsible for societal concern for health and their tasks, health care associated with work and working environment, regulates the relations between the health-care system and health institutions as well as the assertion of health insurance rights. Pursuant to the Act, the health-care system encompasses a system of social, group and individual activities, measures and services aimed at promoting health, preventing disease, early detection of disease, timely medical treatment, care and rehabilitation of sick and injured persons. By applying the measures of economical, environmental and social politics, the RS creates conditions suitable for the implementation of the health-care system and tasks of promoting, preserving and restoring health, while harmonizing the operation and development of all the relevant areas with the health-care system objectives.

The responsibility for health care planning and implementation lies with the Ministry of Health. The state has the right and obligation to determine by law the guaranteed scope, quality and access to health-care services for the entire population, and to set priorities in the implementation of health care rights.

The RS devises development plans and anticipates health care requirements by creating health care programmes and capacities. A health care plan is based on an analysis of the level of the population's health and arises from the need for comprehensive health care, while taking into consideration human resources and other capacities, and ensuring reasonable distribution of tasks. It contains long-, medium- and short-term definitions. The health care plan of the Republic of Slovenia includes the following:

- Strategy of health care development,
- Priority development areas,

- Health care tasks and objectives,
- Platforms for the development of health care activities at specific levels, including training and advancement of knowledge of health care professionals, as well as the development of the health insurance system,
- Specific requirements and potentials of health care in individual regions,
- Persons responsible for the implementation of the health care plan,
- Criteria for the public health service network, considering the level of access to health care services by region.

The basic strategy of the health care policy is to promote the development of the health care and health insurance system in a way to improve the quality of the population's health and the system functioning in accordance with the financial resources available.

Institutional deficiencies identified

In the field of monitoring environmental impact on health, deficiencies in systematic collection of relevant data on the level of exposure to potentially harmful substances and their impact on / correlation with the level of health may be observed. Consequently, Slovenia has no basis of data on exposure to similar substances available.

The level of access to trustworthy health-care information and programmes for the public at large is insufficiently high. Data and information are dispersed across the various health care units. Certain data relevant to health care planning are deficient, particularly analyses on the basis of the collected data providing a survey of the many different and interwoven factors adversely affecting human health.

Moreover, a fragmentary nature of non-governmental institutions and their insufficiently defined role may be observed. The role of non-governmental institutions is vital to the lines of activity where the state is unable to meet all the requirements of the population.

2.3.7.1 Health care programmes

The resolution on the national health care plan is based on the Health Care and Health Insurance Act, and adheres to the directive of the European health care strategy "Together for Health 2008-2013, adopted by the European Council in 2007.

2004 was the expiration year of the National health care programme which was in effect between 2000 and 2004, providing that by inclusion in modern orientations we are opting for health-care policies aimed at providing healthy growth, physical and mental development for the entire population of Slovenia to enable them to live long and healthy lives to be able to fully contribute to the development of our society. That period of time witnessed demographic, social, financial and political changes necessitating fast and radical response to provide safe and quality services in a financially sustainable health care system, in a situation of increasing requirements and expectations from customers with a high level of awareness.

With the above stated resolution, health has become an integral part of all the policies, in particular the financial, labour and traffic, environment protection, agriculture and food production, education, sports and social welfare, enabling to maximize our efforts in all the areas to preserve health as a leading value.

The measures for achievement of objectives provided by the resolution also include the following two objectives coinciding with the goals of the Stockholm Convention:

1. Identification and management of environmental health risk factors,
2. Health threat management (infectious diseases, chemical safety, radiation safety).

2.3.7.2 General level of health of Slovenia's population

The data on the causes of out-of-hospital visits reveal that respiratory diseases rank first in Slovenia. They are followed by musculoskeletal disorders, injuries, nervous system and sensory organs diseases etc. The hospitalization rate due to cardiovascular diseases and neoplasms has been on an increase, whereas the hospitalization rate due to injuries and intoxications has been fluctuating over the last decade, nevertheless manifesting slow growth. The major reasons of absence from work are musculoskeletal system disorders and injuries.

Similarly to other EU countries, the major causes of death in Slovenia include cardiovascular diseases followed by cancer and injuries. Cardiovascular diseases represent the leading cause of death in the population group aged 65 years and above, while being a significant mortality factor from age 45 onwards. The age-standardized rate of mortality due to cardiovascular diseases has been slowly diminishing, yet it is still slightly higher than in other EU countries.

The incidence of cancer has been on a steady increase. In 1995, it was more than 33% higher than a decade earlier (its incidence in the male population exceeding by 11% that in the female group). In males, lung cancer is the most frequent, followed by large intestines and anus cancer, skin, laryngeal and pharyngeal cancer, oral cavity cancer, gastric and prostate cancer. In females, breast cancer ranks first, followed by skin cancer, large intestines and anus, uterine, gastric, cervical and lung cancer.

High mortality rate due to injuries and intoxications caused by medicinal (medications, drugs) and non-medicinal chemicals (carbon monoxide, alcohol, pesticides, organic solvents, other gases) remains the cause of considerable concern. In children, unintentional intoxications are prevalent, compared to adult population where intentional intoxications account for about 50% of hospitalization cases. Injuries and intoxications represent the leading cause of death between the age of one and 45. Intoxications generally account for 1-5% of all the hospitalization cases.

2.3.7.2.1 General information about pesticide intoxications

All the pesticides containing POPs are insecticides. Their target site of action is the central nervous system where they induce hypersensitivity of nerve cells by

interfering with the distribution of neurotransmitters or ion channel transmitters. In case of intoxication, this results in the following manifestations:

- Behavioural changes,
- Sensory disorders,
- Balance disorders,
- Uncontrolled muscular activity,
- Depression of vital centres.

The characteristic clinical symptoms of intoxication with chlorine organic insecticides include nausea, vomiting, partial paralysis of the tongue, lips and face, restlessness, anxiety, irritation, tremor, convulsions, high level of reactivity to stimuli, coma, respiratory failure and death.

2.3.7.2.1.1 Survey of pesticide intoxication cases

The Slovenian Health Protection Institute has been keeping records of intoxications for hospitalized patients since 1988 in accordance with the International Classification of Diseases ICD (from 1988 - 1996 in accordance with ICD-9, and since 1997 in accordance with ICD-10). According to ICD-9, pesticides did not have a special three-character code, and halogenated pesticides were coded under 989.2. In their classification of pesticide intoxications, the data in the ICD-10 have their three-character code T60, and halogenated insecticides have their four-character code T60.1. In addition to substances such as aldrin, endrin, dieldrin, heptachlor, chlordane, dicophol, endosulphane, DDT and HCH, dichloro-diphenyl-ethane and metoxychlor also belong to this group. Chemicals belonging to POPs, however, cannot be demonstrated statistically separately in accordance with any ICD.

In the period between 1997 and 2000, 9 deaths and 17 hospitalizations due to intoxication were recorded in Slovenia, regardless of pesticide type. Death was caused by an insecticide only in one case, while in two cases intoxication led to hospitalization.

A survey of the intoxication data shows that the average age of intoxicated persons is 55 years, the percentage of females and males being almost identical. Worth noting is the fact that 50% of the 9 deaths were caused by intentional (self) intoxication.

The survey also shows that despite the small number of intoxication cases in Slovenia, intoxication incidence has been on an increase (it is highest in the Štajerska, Posavje and Dolenjska regions). It should also be pointed out that in 65% of the cases intoxication was caused by an insecticide.

2.3.7.2.1.2 Occupational exposure to POP substances

Since 1989, occupational exposure to POPs pesticides has been almost non-existing. To a small degree, occupational exposure still exists in PCB. Although the PCB manufacture was discontinued in 1985, PCB devices are still being used in the electricity industry. Burden on the population may only result from past occupational exposure to POPs. Only one study of the effect of PCB on humans in the region of Semič was carried out between 1990 and 1992. No studies have been performed on the effect of pesticides containing POPs. In 2005, trial biomonitoring of POP

substances in breast milk was performed, and after 2007 the practice will gradually spread to all the parts of the country.

Due to the fact that PPP with POPs have not been used in Slovenia for a long time now, there is no risk of acute intoxication of humans, the only risk being the impact from outdated stock and waste. To prevent similar incidents, training of users and sellers of phytopharmaceuticals has been organized in accordance with the regulations on hazardous waste management.

Residues of POPs in food, water and air may present a source of chronic exposure. Human beings ingest them in food and water, while part of them are absorbed through the respiratory system and skin. The chronic effects of pesticides from the group of stable organic substances are even more important as due to their lipophilic nature they accumulate in fatty tissues (bioaccumulation) throughout the organism's life.

2.3.8 Survey of current situation in the field of information exchange, communication, education, raising the level of awareness, participation and training

Before starting to implement the programmes for the development of the system of communication, education, raising of the level of awareness, participation and training of various stakeholders, we have to have the following information available: the types of POPs still being used in Slovenia, emissions and imissions, burden on the environment (water, air, soil, waste) as well as foodstuffs and drinking water. In addition, we should have a strategy for environmental pollution management in place. Deficient, inaccurate and above all, misinterpreted data can be both misleading and "hazardous" to a certain extent. Caution is needed to avoid overestimation or underestimation of the POPs issue. Consequently, effective and transparent public communication about the issue is essential.

In Slovenia, the current capacities in the field of POPs-related information exchange are subject to the regulations on the monitoring of emissions into various environmental segments. The resulting data are submitted by various contractors in the form of reports to the client – administrative authority. The client uses the obtained information to provide reports to various international institutions and to meet the government requirements. Special attention should be drawn to the fact that no specific monitoring or reporting focused on POPs is involved but rather regular reporting on the substances monitoring as provided by the Stockholm Convention.

The field of training is better organized – professional administration officers may take part in seminars and workshops covering their line of activity and organized by ministries or contractors. Programmes of training on hazardous substances management as well as the measures to reduce or prevent their emission into the environment are often ceded to professional institutional contractors. A great deal of activities (particularly in the field of the IPPC Directive implementation) is performed outside institutions in the form of direct cooperation between research institutions and economy.

With regard to the field of information, education, raising of awareness, participation and training of stakeholders, the capacities are highly fragmented and dispersed. The current situation indicates that at this moment the Republic of Slovenia has no comprehensive system in place to be able to deal with POPs in an effective, comprehensive and quality way. Furthermore, it can be concluded that there is no institutional framework serving as a basis for the implementation of the Stockholm Convention.

Pursuant to the Stockholm Convention, the parties have to provide public access to any information about POPs that is relevant to human health and environmental protection.
Responsibility for reporting in accordance with the Stockholm Convention lies with the Ministry of Health, Chemicals Office of the RS.

The parties also have to provide reporting on the operative measures and their efficiency. Consequently, the respective party is obligated to establish a system of monitoring and assessing the efficiency of specific measures.

The parties also have to provide public announcement of the results of studies, development activities and monitoring performed in the field of POPs in a timely manner and on a regular basis.

Weaknesses and strengths of the current system

In the field of POPs (with the exception of PCB and PCT), Slovenia is preparing measures in the areas of education, raising of awareness and training as anticipated in the action plan. In the institutions following the monitoring results, POPs have no special status either, although it is expected that the adoption of a national operative plan will bring about the attention needed (particularly in the field of PCDD/PCDF).

Table 24: Weaknesses and strengths of the system

Weaknesses:	**Strengths:**
♦ Fragmentation of existing data ♦ Lack of stakeholders interaction ♦ Inadequate public communication ♦ Inadequate reporting on the issue Absence of educational and awareness-raising materials ♦ Insufficient knowledge of the burden on the population ♦ Absence of bases for human health protection against POPs impact due to exposure	♦ Current institutional framework*

* Strengths are provided on a conditional basis only, as a comprehensive analysis of the current state of the system as well as assessment of the capacities of each individual institution responsible would be needed.

Reporting system

The current administrative reporting system provides no special reporting requirement for POPs. Data and information obtained through the monitoring of imissions and emissions are more or less “hidden” among other data and information.

Table 25: Reporting on data resulting from monitoring

Monitoring	**Reporting**	**Regularity (frequency)**
Imission monitoring of groundwater	MOP	Annual Report
Imission monitoring of the chemical status of surface water	MOP	Annual Report
Monitoring of groundwater pollution by hazardous substances	Liable person	Annual Report[i]
Monitoring emissions of hazardous halogenated hydrocarbons in effluents	Manager or owner of the source	Annual Report[ii]
Operational monitoring of emissions at the water sewage from the plants for treating used gases of the waste incineration plant and in the co-incineration of waste	Manager	*iii*
Monitoring of pesticide residues in drinking water and drinking water sources	Operator	Annual Report[iv]
Monitoring of pesticide residues in agricultural products	Operator	Annual Report[v]
Monitoring of pesticide residues in food	Operator	Annual Report [v]
Monitoring the safety of drinking water	Manager	Annual Report[vi]
Operational monitoring of waste water	Liable person	Annual Report[vii]
Operational monitoring of emissions into air from stationary sources of pollution	Liable person	Annual Report[viii]
Operational monitoring upon release of hazardous substances and PPP into soil	Liable person	Annual Report[ix]
Monitoring emissions from waste disposal	Manager	[x]

[i] Supervision is performed by the inspectorate responsible for environment (primarily monitoring the landfills, see footnote x).

[ii] Manager or owner of the source of pollution must every four years provide MOP with a programme of action stating the type and annual quantity of hazardous chlorinated hydrocarbons produced, used and discharged through waste water.

[iii] Managers of these devices have an adjustment period until 31 December 2005.

[iv] Operators report to the Ministry of Health (Health Inspectorate). The Minister annually informs the public about the results of monitoring and the planned activities.

[v] Operators reported until 2004 to the Ministry of Health and MAFF, which at least once a year informed the public about the results of monitoring and the planned activities. The results of monitoring are now reported to the European Union.

[vi] Operators (IVZ and regional ZZVs) report to the manager. The managers at least once a year inform the local public on the health (safety) of drinking water.

[vii] Liable persons report on occasional or permanent measurement to MOP.

[viii] Liable persons report to MOP on the initial and periodic measurements, while the liable persons keep reports on the continuous measurements for at least five years.

[ix] Liable persons report to MOP and MAFF. The legislator did not prescribe the form of report.

[x] Managers are obliged to draft waste assessment based on chemical analyses. For reporting on the exposure or pollution of underground waters by hazardous substances see note i.

Beside the above stated forms of mandatory reporting, the state of the environment is also subject to regular reporting pursuant to the Environmental Protection Act.

Review of information, training, awareness-raising, participation and education on the liabilities under the national law

According to the Slovenian legal order, the duties of informing, training, awareness-raising, participation and education on POPs are primarily ensured at the level of programming documents and the subordinate operational programmes.

The existing legislation on POPs covers all environmental elements (water, air, waste, soil), drinking water and foodstuffs. Laws and regulations on emission and imission monitoring of POPs include the provisions on reporting to the competent bodies (predominantly in the form of annual reports), and the provisions on publicity.

Programming documents

The duties of informing, training, awareness-raising, participation and education on POPs in line with the Slovenian law are primarily the matter of programming documents and the subordinate operational programmes.

- in the field of education, training and information, NPVO provides continuous education and training of expert profiles responsible for water management and regular information of the public on the state of aquatic environment, but does not specifically refer to POPs.
- as regards waste management, the NPVO provided primarily the education, training and information programmes for minimizing and recycling, but did not directly refer to POPs.
- In the field of air protection, the NPVO provided a measure of general information and education of the general public, the industry and the public sector.
- NPVO declared certain measures in the field of education, but the body drafting the programme considered that these activities can be implemented within regular activities and therefore no additional resources were required. The situation is similar in the field of awareness raising and public participation.

Strategic guidelines for waste management in the Republic of Slovenia have envisaged a comprehensive (integrated) work with various actors involved in the PCB/PCT waste management.

Table 26: Public information in the operational programme of PCBs and PCTs disposal

Informing the target public (education, training and information)	Institution	Period
- set up a programme of informing the target public (production and energy sector) on the duties in phasing out PCB, maintaining PCB devices, and the risks for health and the environment.	ARSO, GZS ARSO	2003/IV
- set up a programme of informing the public on PCB in everyday life and environment	ARSO, GZS	2004/IV
- Implementation, monitoring and evaluation of public awareness / carrying out campaigns		2005 - 2006

The Operational Programme for the management of waste oils for the period from 2003 to the end of 2006 primarily focused on upgrading the existing information and reporting system and broader participation of target audiences.

Table 27: Public information in the operational programme of managing waste oils for the period from 2003 to the end of 2006

Integration of the target public	Institution	Period
First phase:	MOP, ARSO	2003
- Preparation of a communication programme to support the management of waste oil		
Second phase:	MOP, ARSO	2004
- Implementation of the programme (information):		
- Identity of the existing infrastructure,		
- Upgrading of infrastructure for public participation	MOP, ARSO, GZS	2004 - 2005
Third stage:		
- Implementation of the programme (co-operation, communication, education)		

Implementation of operational programmes:

Operational Programme for the disposal of polychlorinated biphenyls and polychlorinated terphenyls for the period from 2003 until the end of 2006

The resources needed for meeting the requirements of this operational programme from the state budget are estimated at around EUR 108,500, primarily for the preparation of detailed plans, setting up the necessary records and implementing the awareness raising campaigns for targeted public (EUR 20,900 are envisaged for this).

Operational Programme for the management of waste oils in the period from 2003 to the end of 2006

For the implementation of (the entire) operational programme, EUR 1,268,600 was provided in the budget for the year 2003; and EUR 1,293,600 for the year 2004 (about 60% of the levied fees). As regards the provision of funds in 2005 and 2006, EUR 1,752,600 was planned for 2005, and EUR 1,919,600 for the year 2006.

2.3.9 The position of NGOs in the environmental field in Slovenia

The impact on policy making and strategic guidelines is becoming an increasingly important mission of NGOs, which is recognized both by the representatives of the local and the national authorities, and the NGOs themselves. As drafting of the strategy papers has to respect and balance various professional platforms, attain inter-ministerial coordination and political consensus, and involve the regional and the local level, the drafters of the documents have to ensure a balanced impact of different interest groups.

A large number of Slovenians are members of non-governmental organizations, mainly societies (more than 16,000) in Slovenia. The total number of NGO members is difficult to assess because of the great diversity in the membership, comprising of

a few dozen to several thousand members in one organization. Apart from associations covering a major proportion of 97%, the remaining 3% include 125 institutions and 200 private institutions.

Better working conditions in the environmental field are expected with the ratification of the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (UNECE, 30.10.2001), the application of directives ensuring the implementation of this Convention, Directive on the Strategic Assessment of Environmental Impacts (OJ L 193 21.7.2001), the Framework Water Directive (OJ L 327, 22.12.2000), and some other directives recognizing the importance of the non-governmental sector.

2.3.9.1 Overview of the situation of NGOs in the environmental field in Slovenia

Since 1990, the number of NGOs is growing steadily, particularly the number of associations: in 1990, 10.320 societies were registered in Slovenia, in 1995 13.984, in 1997, the number rose to 14.747, while in 2002, more than 16.000 were registered.

Even before the independence of Slovenia, the environmental NGO movement was relatively visible, influential and branched. In the nineties, the sector strengthened, not least, because of new programs, established by the Regional Environment Centre for Central and Eastern Europe, Soros Foundation, the Ministry of Environment and Spatial Planning, certain municipalities and embassies, to co-finance such activities. Today, there is approximately 110 NGOs active in the environmental field, of which 15 are active at the level of system design of environmental policies.

Among the reasons for the increase in the number of environmental and nature conservation NGOs and their more dynamic activities in the 90's, is certainly their accessibility to finance environmental and nature conservation activities. After 1993, programs for co-financing such NGOs activities started to be implemented by the Regional Environmental Centre for Central and Eastern Europe (REC), Open Society Institute - Soros Foundation, the Ministry of Environment and Spatial Planning (MOP), municipalities and embassies (mostly British, Canadian and U.S. Embassy). Although relatively small, this sort of financial assistance encouraged environmentalists to the preparation and implementation of many projects. A more lively action in the environmental and nature conservation field connected the NGOs together into a sector that has gained importance and visibility.

For the important process of growth and strengthening of environmental NGOs in Slovenia, especially REC and Umanotera, Slovenian Foundation for Sustainable Development, are notably active, and at the governmental level, the Ministry of Environment and Spatial Planning.

Important projects in the field of sustainable development were realized: NGOs, Agenda 21 for Slovenia (1995), Local Agenda 21; Analysis of the situation (1996), Green Budget Reform (1997), Green Pages (1998), Informing the public about the EU (1999), Green Partnership (2000), EU, Slovenia and Sustainable Development (2000), Slovenia GMO-free (2001), Moderation of group processes (2001), Pinocchio, the government's Mirror (2001), The process of Rio + 10 in Slovenia (2002).

Already in the early nineties, The Ministry of Environment and Spatial Planning as the line ministry, was aware of the importance of NGOs activity as an important player and (somewhat later), as a partner in environmental protection.

Through a decade-long cooperation, various forms and levels have been established:

- Since 1993, MOP has been launching public tenders for funding NGOs to promote environmental protection,
- In the early nineties, the tradition of meetings between representatives of the MOP and NGOs began, which grew from initially more or less unsuccessful platforms into more organized and regular thematic meetings,
- With the preparation of National Environmental Action Program in 1997/98, a more active participation of NGOs in the preparation of various documents (strategies, programs, laws, etc.), being elaborated in the MOP, started; on this basis, also the Instructions on the procedures for the preparation of general legal acts and other documents by the MOP, has been prepared,
- NGOs are also involved in six of the working bodies of the Ministry, which comprise of one to three of their representatives,
- Preparations for the World Summit on Sustainable Development (Johannesburg, 2002) were held under the auspices of the Slovenian Council for Sustainable Development and in partnership with the NGO Umanotera. They started in 2001 with an elaboration of Expert analysis for the preparation of reports on the implementation of sustainable development in Slovenia, and continued in 2002 with a series of workshops, which were attended by representatives of ministries, business, local communities, NGOs and other experts.

2.3.10 Review of the technical capacity for POPs management: measurement, analysis, research and development, linkages with international programs and projects

2.3.10.1 Administrative and technical capacity of the responsible institutions for the PPP

The competent institutions and personnel are involved in work on administrative matters, drafting of regulations, international cooperation in accordance with the regulations, coordination of work for the harmonization with the acquis and preparing programs of the national strategy in the field of plant protection and pesticide residues in food and agricultural products.

The Ministry of Agriculture, Forestry and Food or the Phytosanitary Administration of the RS is competent for the preparation of regulations in the field of plant protection products. In addition to drafting legislation, the coordination of the process for plant protection products, management and coordination of various international projects and cooperation, the PARS also keeps various records in accordance with the PPP Act.

Health, agricultural and veterinary inspection are involved in various forms of health control of foods, or indirect control of pesticide residues in foods of animal origin and

the direct or indirect control over the circulation and use of PPPs and pesticide residues in agricultural products.

For the needs of the Veterinary Administration of the RS or the MKGP, laboratory tests for organochlorine pesticide residues in food and feed of animal origin, and agricultural products, are carried out by accredited laboratories.

2.3.10.2 Administrative, research and technical capacity for managing of PCB and other POPs

In Slovenia, there are several laboratories with the technical and human capacities for the analysis of PCB and other POP compounds, but so far, there are five, which can perform the analysis on the basis of accredited methods (Annex 6).

In Slovenia, there are even more laboratories with authorization to undertake analysis of organic compounds, which have not yet acquired accreditation for the analysis of POPs or are in the process, but have adequate equipment and trained staff to carry out such analysis.

In 2007, there were 17 collectors and exporters of PCB, which are also reporters, in Slovenia: C&G Ltd, Ljubljana; Alpkem, Ltd, Kranj; Altego, Ltd, Ljubljana; Chemeco, Ltd, Ilirska Bistrica; Eko-Les, Ltd, Ptuj; Ekol, Ltd, Kranj; Ekologija, Ltd, Ljubljana; Agni Consulting, Ltd, Trzin; Ekosan, Ltd, Slovenj Gradec; Kemis, Ltd, Radomlje; Indaver Servisi, Ltd, Ljubljana; Lakolit, Ltd, Koper; Mikro+Polo, Ltd, Maribor; Poslovni Center Pronia, Ltd, Ljubljana; PUP-Saubermacher, Ltd, Velenje; Saubermacher&Komunala, Ltd, Murska Sobota and Snaga javno podjetje, Ltd, Maribor. Only one company has a permit to carry out decontamination of PCB equipment (C & G, Ltd.). For the contemporary storage of PCB waste facilities, 15 collectors were recorded with a total area of about 700 m $^{2.}$

2.3.10.3 Research on the field of POPs

2.3.10.3.1 Research on plant protection products with POPs in the environment in Slovenia

Soil

Of all parameters analysed during the tasks of the Research of soil contamination in Slovenia (2002), only DDT and its derivatives were still present (defined in 17 samples), namely in areas with intensive agricultural production (Drava-Ptujsko polje, Krško polje, Koper surroundings, Celje surroundings). Concentrations of DDT and its derivatives in any of these specimens did not reach the warning levels.

After withdrawal of chlorinated hydrocarbons in agriculture, the quantity of their residues in soil and plants is continuously decreasing.

It was found that the amount of residues of chlorinated hydrocarbons in the soil (arable land) is continuously decreasing or is basically negligible. Wells from intensive production areas show that the concentrations of chlorinated hydrocarbons over the complete cross section are extremely low. Although concentrations of chlorinated hydrocarbons in the subsoil of extensive arable areas are insignificant, still, at some places, residues were rinsed to stable foundation (2002).

Foods

Latest available evaluations of food samples analyzed for the presence of POPs residues show that concentrations of analysed organochlorine pesticides in the samples were below the applicable limits. Data on the content of pesticides are comparable to the results of the national monitoring of pesticides in foods in the period of 1998-2001.

We can indicate the same meaning from preliminary assessment of foods namely, inter alia:

- that the food, provided for Slovenian consumers, is POPs-safe
- that the level of contamination of foodstuffs of animal origin with chlorinated hydrocarbons - mainly meat (as cattle, pigs, poultry and game) is decreasing year to year, while the rate of contamination of milk, fish and eggs with chlorinated hydrocarbons is not a problem (1995),
- that for food of animal origin as indicators of environmental pollution, the conclusion, that they are not contaminated with chlorinated hydrocarbons, is applicable (1996),
- the maximum allowable values of organochlorine pesticides were exceeded in 1999 in some samples of imported meat, which was considered mainly for calves from Hungary. Import of such calves was replaced by import from other countries
- concentrations of POPs in the analysed samples of cattle and pigs according to the regional division of Slovenia were not significantly different (1992),
- according to the preliminary control in Slovenia, it is evident that this problem is not urgent and that, according to the detected values, Slovenia characterizes as a country with low pesticide residues in agricultural products.

2.3.10.3.2 Research on the impact of POPs, which are pesticides, on human health in Slovenia

In Slovenia, only one study on the presence of DDT was carried out in 1998, titled ‘Environmental impact of pesticides on their concentration in the serum of women 30 days after birth’.

Results showed no differences between the sample group and the control group of women.

2.3.10.3.3 PCB research in Slovenia

Monitoring of ecological effects on the environment with PCB in the polluted area of the Krupa River

Since 1984, when the contamination of the Krupa River was found, and the implementation of remedial measures began, many measurements of pollution in the environment (air, water, soil, and sediment and biological materials) and research of health and ecological risk in the affected area, have been carried out at the same time (Fazarinc A. 1992, Fazarinc R. 1994, Iskra Semič Kondenzatorji. 1985-1992., MOP - ARSO. 2002, Police S. 1997. In addition, other researches, related to the problems of PCB, were carried out by institutes and faculties of the University of

Ljubljana (M. Blatnik 1992, Cencič-Kodba Z. 1998, Jan J. 1988, Police S. 1987, 1996, 1997, 2003 , 2004, Zupancic-Kralj L. 1991, 1992, 1993, 1994).

The large material from measurements and researches of contamination with PCB in the cited sources provides a fairly transparent picture of concentration levels and trends of PCB contamination of the endangered zone in the past period of rehabilitation.

PCB content in surface water of the River Krupa in the period 1985-1988

From 1985 to 1988, average concentrations of PCBs were being measured in composite samples of water of the River Krupa, and 1988 onwards, under surveillance monitoring, only occasional measurements of the current PCB content in the water, have been carried out.

The measurements were carried out under the following tasks:

- *Monitoring of the quality of surface waterways in Slovenia*. Overview of the load of surface water "source of the Krupa-Lahinja-Kolpa" in the period of 1986-2002 (Source: MOP - ARSO, 2002).
- *Analysis of the PCBs content in unfiltered samples of surface water at the spring of the Krupa River since the end of 1985 until the beginning of 1988.* (Source: Iskra Semič Kondenzatorji et al., 1985-1994).
- *Analysis of the PCBs content in surface water of the River Krupa in the years 1989 - 1991.* (Source: Fazarinc A. et al., 1992; Iskra Semič Kondenzatorji et al., 1985-1994; Polič et al., 1997).
- *Analysis of the PCBs content in surface water of the River Krupa in the years 1991-1995.* (Source: Polič, 2004; Župančič-Kralj et al. 1993, 1994).
- *Analysis of PCBs content in the water at the source of the River Krupa (I) and at Perov mlin (II) in the years 1996-2002.* (Source: Polič, 2005).

All results of previous measurements of PCB content in the water of the Krupa River from regular monitoring and other research in the twenty years' period 1982 - 2002 are shown in Figure 12.

Comparison of all collected measurement results of PCB content in the water of the River Krupa shows a strong reduction of the average values of measured PCB concentrations, especially after the implementation of remedial actions and works, for more than ten times.

The content of PCB in the sediment of the Krupa River

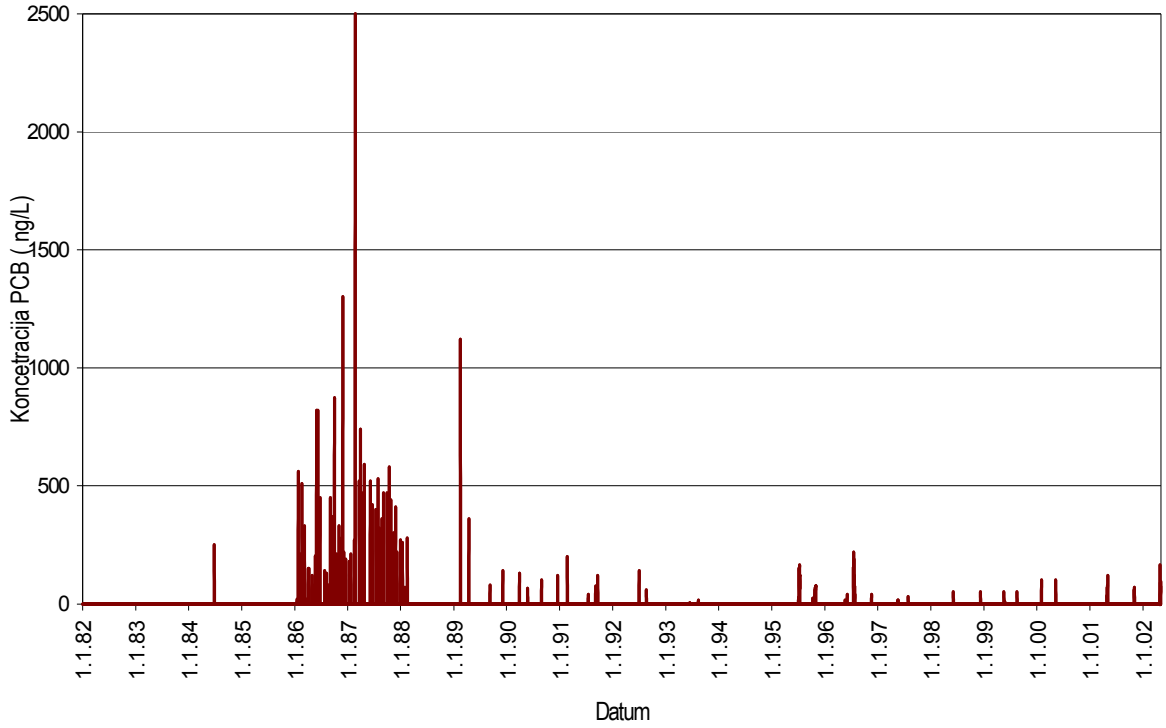

Figure 12: Measured concentrations of PCBs in the water of the Krupa River during 1982 to 2002 (108 measurements)

PCB content in the air

Most measurements of air pollution were carried out during the period of 1984 - 1986, during the operation of technological lines of PCB condensers and the first large-scale landfill dug in 1984 for the analysis of soil contamination at the factory disposal and in 1986, when the excavation of contaminated soil and the building of final repository for waste PCB - contaminated land began. Measurements of the PCB in the air were also performed later in the year 1991 in the larger area (Semič, Metlika, Črnomelj) and in the area of the canyon of Krupa River (Source: Fazarinc A. et al., 1992; Iskra Kondenzatorji Semič et al., 1985-1992; Polič et al., 1997).

The measured and model calculated air emission throughout the course of the Krupa canyon within the measuring period of 1995 - 1996 was about 300 g / year, which is estimated to be more than five times less than in the measuring period of 1985 - 1986 before the rehabilitation works on the repository ten years ago.

Last survey of pollution and ecological load of the Krupa River

All past, current and future transfers, distribution and accumulation of PCB contamination and ecological loads of the environment in the area of the Krupa River during the operation of Iskra factory are estimated, before and after the cessation of production and the rehabilitation of the production of condensers with PCB until 2015.

Comparison of all measurements results of PCB content in the water of the Krupa River during the period after 1985 shows the strong reduction of the average PCB

concentrations in water. Occasionally still very high PCB concentrations in the water show a relatively strong leakage and rinsing of PCB with long-term precipitation from unknown underground contaminated zone.

Measurements during the period of 1995-2002 show that PCB emissions from the underground soil decreased significantly and only after stronger precipitation in the hinterland. This shows that the PCB from the underworld is floated up mainly by the transfer of polluted sediment at increased flow.

By using quality measurements of flow and PCB content in the water of the Krupa River, the model of the PCB concentration in dependence to the River flows for each period in the past, present or future, could be made.

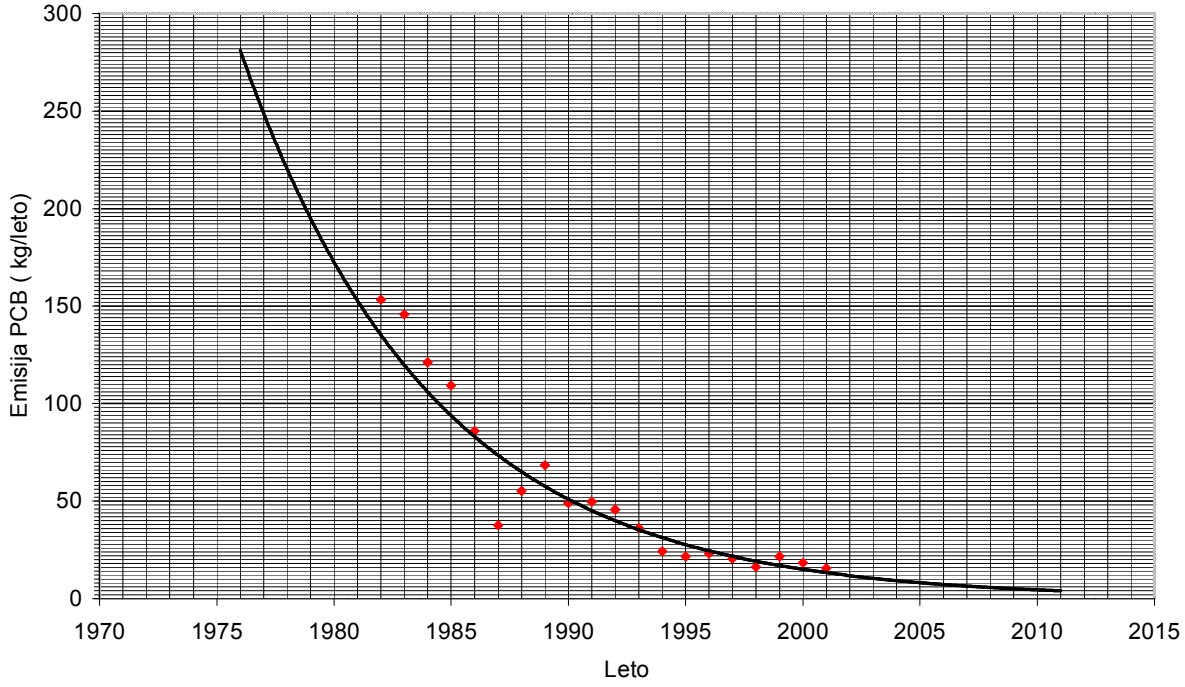

Figure 13: Model-calculated PCB emissions from karst underground into the water at the spring of the Krupa River

With the constructed model, based on artificial neural networks, the dynamics, transport and mass balance of PCB pollution of the karst water system of the Krupa River is calculated with more than 90% certainty. Results of modelling also enabled the verifying of effectiveness of the remedial measures in the endangered zone of the Krupa River and an assessment for the period prior to 1980 and also the forecast of the dynamics of the River Krupa source pollution by 2015.

In Table 28 the results of the average PCB levels, model-calculated by using neural networks, in water, air and two-meter layer above water surface and along the banks and in fish at the spring of the River Krupa for the period of 1980 – 2010 are indicated.

Table 28: Model of calculated average annual concentrations of PCB in water, air and two-meter layer above water (on the banks) and in fish at the spring of the river Krupa

Model time period	Model calculation of average annual PCB concentrations in water $\overline{C}_v$ (ng/l)	Model calculation of average annual PCB concentrations in the air above water $\overline{C}_z$ (ng/m^3)	Model calculation of average annual PCB concentrations in trout $\overline{C}_b$ (mg/kg)*
1980	830	660	800
1985	420	340	400
1990	210	170	200
1995	110 110	90 90	100
2000	60	50	50
2005	<25	<20	<20
2010	<10 ng/l	<10 ng/m^3	<1 mg/kg

* mg PCB/kg of edible part of fish

Research suggests the possibility of using the already cleaned underground karst water of the Krupa River's hinterland, because the present remaining PCB transfers in the affected environment are very small (up to 100 times smaller) than before the rehabilitation measures were carried out.

The undertaken research is an important expert background for the planned implementation of the system of cleaning and use of underground karst water of the Krupa River hinterland for drinking water.

Research on the PCB content in the environment and in humans in the Semič area

The measurement results of PCB content in organisms and in humans in the period of 1991-1992 are covered by the report of the research project "Assessment of health - environmental conditions in the area of Bela Krajina on the organic load of polychlorinated biphenyls, PCB and related compounds" (Source: Fazarinc A. et al., 1992).

The results of measurements of PCB content in the environment

The research was carried out in the Semič and the Krupa River area. The content of PCB in samples of soil, moss, indigenous-produced foods of plant and animal origin, samples of drinking and river water and caught fish was identified.

Statistically processed results of measurements of the representative biological samples in the period of 1987-1991 - forest floor, moss and fish, are included in the study (Source: Blatnik et al, 1992; Polič et al, 1997).

The content of PCBs in humans

Research on human and environmental load in Bela Krajina, carried out in the period of 1990-1992 (Source: Fazarinc A. et al., 1992), shows that the PCB content in the blood (serum) of people was:

- 481 ng / ml of blood, on average, with employees in Iskra in 1984, and in 1987, 19.4 ng / ml of blood, on average

- 80-500 ng / ml with the inhabitants of the valley Krupa in 1984, and from 0.01 to 4.99 ng/ml in 1991:

The PCB concentrations in serum serve as a measure of exposure to PCB. The obtained concentrations are higher than for people living in an environment that is not contaminated with PCB.

There are no basic conclusions about the effects of PCB on human health, however, there are sufficient scientific information, justifying further action regarding PCB on the field of protection of people and the environment.

These results of PCB content measurements in different samples from the environment and organisms will enable the verification of the current model-calculations and forecasting of PCB contamination in the environment of Krupa River from 2005 to 2015 (Source: Polič, 2005).

2.3.11 Socio-economic analysis in dealing with POPs

Annex F of the Stockholm Convention requires the evaluation of control measures regarding POPs for managing the risk and abandoning the use of these substances. To do so, decision makers must be provided with information on socio-economic impacts of potential measures. In Slovenia, such a socio-economic analysis (SEA) has not yet been implemented.

The objective of the socio-economic analysis, related to POPs, is to provide information on social and economic costs and of the benefits, brought about by the implementation of the Stockholm Convention. Any measure, whether the elaboration of analysis of the situation, using the latest technologies, waste materials treatment or monitoring, affects both the economy as health, environment and justice (at least in terms of distribution of costs and benefits).

In 2006, the European Commission elaborated the study "Identification, assessment and prioritization of EU measures to reduce releases of unintentionally produced / released Persistent Organic Pollutants," including an evaluation of the effectiveness of each measure, costs and socio-economic impact of each action. On the basis of thus estimated various measures, the most effective measures at EU level and national level are proposed. The activity program is made on the basis of these findings and adapted to the situation in Slovenia.

2.3.11.1 Evaluation of the situation in Slovenia

POPs in pesticides

As the use and production of pesticide with POPs is prohibited in Slovenia, the SEA focuses primarily on the creation of systematic monitoring of the concentration of these substances in water, soil, food and feed. Due to lack of data for the records of potential old stocks of these substances, and records of illegal dumps, which represent an unpredictable and uncontrolled risk to the environment and human health, the establishment of SEA also requires the classification of effects of the recording, collection and disposal of these quantities of pesticides.

Proposed actions therefore include:

- monitoring of soil
- continuation and, if necessary, creating a plan for systematic monitoring of imported food and feed

- records of old stocks of pesticides,
- collecting and disposal of old stocks
- records of pesticides in illegal dumps,
- collecting and disposal of pesticides in illegal dumps.

PCB

In Slovenia, the SEA needs to be divided into two sections, based on the state of the PCB field. The first section focuses on the restoration and the monitoring of the state of pollution in the region of Bela krajina, Semič and the source of the Krupa river. Another kind of measures and consequently a different compass of the SEA applies to non-point sources of pollution, represented by PCB devices, for entire Slovenia. It is possible that the latter are still in use and their replacement, decontamination, collection and disposal have to be taken care of. Given the incongruity of data on the existing amounts of PCB, a priority measure is to make a comprehensive survey of PCB devices, decontaminated PCB devices and the possible storage of waste PCB, as well as of facilities for temporary storage and other ways of handling during transportation to destruction. Evaluations also reveal that in Slovenia holders still have at their disposal PCB devices which have reached the end of their service life but have for various reasons not been yet removed.

Unintentionally generated POPs

The national emissions of dioxins and furans are listed in Table 8. The calculated emission of dioxins and furans into the air amounted to 11.15 g I-Teq in the year 2000. The existing monitoring does not encompass the measurements of concentrations of dioxins and furans in waters and the ground. Inspections of foodstuffs so far made have not shown a contamination with contents of dioxins and furans, which would exceed limit values as determined in current regulations of the Republic of Slovenia.

Only on the basis of data from precise inventorying of dioxins can an evaluation of the consequences of the state in the environment (ground, water) and in the human organism (fat tissues, blood, breast milk) be formed. Connected with the issue is the determination of priority goals, the formation of measures to reach these goals and the monitoring of how efficiently they are being implemented. Part of the information needed is an evaluation of the existing legislation which regulates individual areas mostly in the sense of the efficiency of the foreseen measures and their influence on the lowering of the emissions of dioxins into the environment. Creating the measures can be based only on the data on the state and the collection of the number of existing and foreseen sources of dioxin emissions into the environment in Slovenia.

With the existing waste incinerators (Lek Lendava, Pinus Rače) and the co-incineration plants (such as Termoelektrarna Šoštanj, Elan), suitable measures for the prevention of dioxin emissions through the incineration remains have to be

planned besides measures for the lowering of emissions into the air. This does not apply to cement factories where there are no incineration remains. The same measures are needed also for other thermal processes (unmonitored burning processes outdoors, in metallurgy, small furnaces).

Data on the amounts of incinerated waste which were supplied to the ARSO for the past years are:

- Year 2002: 927 t
- Year 2003: 1,938 t
- Year 2004: 1,945 t

In Slovenia, the majority of infectious health care wastes have up till now been first thermally treated (sterilised) and then placed into disposal facilities.

A socio-economic analysis should encompass the following alternatives:

- using BAT technology,
- using the latest procedures in monitoring dioxin emissions
- using the most modern ways of handling incineration remains
- possibility of the execution and the effects of the lowering of dioxin emissions into the environment with alternative ways of handling waste (recycling), prevention measures).

Given the fact that waste incinerators can represent a larger source of POPs substances from anthropogenic sources, the planning of waste incinerators in Slovenia has to include the drawing-up of a thorough SE analysis of the various ways of handling waste.

2.3.11.2 A draft of the scope of the socio-economic analysis

The potential measures for lowering the risks and the scope of the socio-economic analysis connected with this is, within the frame of the Stockholm Convention, different for different POPs substances, especially when taking into consideration whether individual substances are still being used (PCB, pesticides) or if and to what extent there are individual sources of their unintentional generation of the said substances.

2.3.11.2.1 Pesticides

The monitoring of water sources, groundwater and sediments does not reveal these elements of the environment to be burdened with pesticides containing POPs. The results of the soil monitoring programme show that some sampling sites stand out, especially in concentrations of DDT and its metabolites. The production and use of pesticides containing POPs are prohibited in Slovenia and that is why the measures are aimed predominantly at the setting-up or the continuation of the systematic ground monitoring as well as the monitoring of imported foodstuffs and animal feed. Beside this, there is a need to record, collect and remove old supplies of pesticides and illegal dumps of these substances.

Costs of monitoring the ecologic burdening of the environment with pesticides

Since pesticides are persistent substances with long-term effect on the environment and people's health, a time period and a way of systematic monitoring and reporting on the state of the ecologic burdening of the environment with pesticides in Slovenia (air, water, ground, food) need to be determined. Monitoring the said state provides a possibility of evaluating the efficiency of the measures which have been carried out. The SE analysis thus includes the costs of the setting-up and the functioning of systematic monitoring of (predominantly) the ground as well as the collection of data.

Costs and benefits to people's health
In the frame of the socio-economic analysis we need to establish whether higher values of DDT and its metabolites, measured in the soil at certain sampling sites represent a risk to people's health and also connected costs (morbidity, mortality, quality of life, medical costs, etc.). Beside this, the costs and benefits of the designing and execution of systematic monitoring of imported foodstuffs and animal feed need to be taken into consideration.

Costs of the collection and removal of old supplies of pesticides with POPs
Despite the fact that the production and use of these substances is prohibited, an inventory of old supplies of pesticides held by merchants and end-users (companies, farmers, individuals) provides a reason for carrying out a collection of the remaining supplies of pesticides. Target groups need to be suitably informed of the manner and location of the collection of these substances. Later, the collected amounts of pesticides have to be appropriately removed.

To establish the effect of the costs of the collection and removal of old supplies on individual participants (users, companies, local communities and others), it is of priority to determine who is responsible for the informing, the collection and removal of old supplies.

Costs of recording illegal pesticide dumps and their restoration
Individual appearances of pesticides in water may be the result of unmonitored pesticide dumping on illegal dumps, which present potential threats to sources of drinking water. The issue of such dumping has not been resolved yet in Slovenia, therefore it is urgent that a record of illegal pesticide dumps be created and that they be restored. The costs of recording and restoring such dumps, similarly to other old debts, will burden the national budget in the first place.

2.3.11.2.2 Polychlorinated biphenyls (PCB)

In the field of PCB handling, the creation of the SEA has to be divided into two sections. The first applies to the restoration and the monitoring of the state in the region of Bela krajina, Semič and the Krupa river; the second applies to measures connected with non-point sources of pollution, which are in force for entire Slovenia.

Bela Krajina, Semič, the source of the Krupa river
When designing the SEA, it would first be necessary to precisely determine who is responsible for the restoration and the monitoring of the state in the area of Semič and Bela Krajina. Only thus can the effects of costs and benefits to individual stakeholders (the state, local community, companies, citizens) be established.

Costs and benefits to people's health
Given the excessive PCB burdening of the environment in the area of Semič and the Krupa river and the characteristics of PCB, it is necessary to evaluate the long-term effects of this pollution on people's health and the connected costs (morbidity, mortality, quality of life, medical costs, etc.).

Costs and benefits of monitoring PCB levels in the human body and in agricultural crops
Systematic monitoring of PCB levels in the human body and in agricultural crops has not been established yet for this area. Only with such monitoring will it possible to monitor the efficiency of foreseen measures; moreover, the control of agricultural crops, in connection with suitable measures, should prevent further negative influences on people's health.

Costs and benefits to the economy / local community / state
People's health and quality of life are connected with indirect influences on employment or with the connected company costs in this field (sick leaves, indemnities paid to employees due to excessive exposure to PCB).
Another kind of costs is connected with the monitoring and maintenance of an enclosed waterproof storage facility. A time period and a way of executing the monitoring of the storage facility's condition and any potential release into the environment have to be determined.

Costs of monitoring the ecologic burdening of the environment with PCB
Since PCB are persistent substances with long-term effect on the environment and people's health, a time period and a way of systematic monitoring and reporting on the state of the ecologic burdening of the environment in this field need to be determined. Monitoring the said state provides a possibility of analysing the efficiency of the measures which have been carried out. The SEA thus includes also the costs of systematic monitoring and of the collection of data.

Influences on justice
The restoration and monitoring of the state of ecologic burdening with PCB in this area involve a point source of pollution which influences a quite precisely determined area. The socio-economic analysis thus needs to evaluate also the influence on the so called justice. In the case of the wider area of Semič and the Krupa river, the evaluations concern influences on out-migration from the area and the connected age and educational structures and the changes in the proportion of minorities or ethnic groups. Beside this, it is reasonable to evaluate potential effects on land prices (lowering due to pollution, potential rising after successful restoration) and prices of other immovable property.

Costs and benefits to the environment
The Krupa river and its surroundings shelter extremely rich, endemic and protected aquatic and waterside fauna and flora; important is also the cultural and historical frame of the settlements at the source and in the gorge of the Krupa river. Because of these riches, the source of the Krupa river, its gorge and the narrower natural area are a site of special interest on the local, regional and Slovene levels. In 1997, the Krupa river and its protected area were declared as natural monuments, therefore it

is reasonable to evaluate also the effect of the restoration on the development of connected activities, e.g. tourism.

The project of a comprehensive system of drinking water supply in Bela krajina
Literature informs us that a project for a comprehensive system of drinking water supply in Bela krajina is being prepared. The SEA has to include an evaluation of the costs and benefits of the aforementioned project. It will be possible to evaluate the extent of including the project into the analysis after a revision of the proposed project.

Non-point sources of pollution
PCB from non-point sources represents a smaller and acceptable burden in the pollution of water, air, soil and food. Prior to a detailed formation of the scope of the SE analysis, we need to determine the sources of PCB emissions into the air and to evaluate how the foreseen measures influence the lowering of PCB emissions into the air.
In the frame of determining the scope of the SEA, an inspection of the existing legislation regulating the field of PCB risk management is needed in the first place, especially in the sense of the allocation of responsibilities for the execution of individual foreseen measures and for the sources of financing these measures. Only such an inspection enables an evaluation of the effects of the costs and benefits as well as an evaluation of how justly they are distributed among individual participants.

Costs and benefits to people's health
Given the fact that there is much research in the field of PCB influences on people's health, it is possible, in combination with the evaluations of the daily intake of PCB in Slovenia, to evaluate long-term effects on people's health and the connected costs (morbidity, mortality, quality of life, medical costs, etc.). Of special importance is an evaluation of the effects on the health of employees in companies where devices containing PCB are still being used or stored, of course if this represents negative influences.

Costs and benefits to the economy
<u>Costs of establishing records and reporting</u>
Companies are bound to lead various records, among others a record of functioning and non-functioning devices (reserve devices, written-off devices, waste). Companies have to have written confirmation for these devices and, for transformers, manufacturer evidence that they are not filled with PCB – or the company has to perform an analysis of PCB contents in the oil. The company has to register all functioning and non-functioning devices. Beside this, the company has to run suitable records of PCB-containing-waste management and write yearly reports which have to be kept for 5 years. When devices are being decontaminated, the company is bound to make prescribed measurements and label the devices.

Creating the records and a system of reporting may bring the company additional costs (information system, additional education of employees):

- costs of replacing devices or decontamination
The scope of the analysis has to include the evaluation of costs to companies, which result from the replacement or decontamination of functioning devices and their

labelling. On the other hand, companies which perform the decontamination or supply replacement equipment benefit from the process, which also needs to be considered in the SEA.

- waste management
Companies are bound to appropriately manage PCB-containing waste (storage, labelling, drawing up a plan of waste management, submitting the waste to an authorised waste management company). The height of waste management costs is influenced by the choice of methods for the removal of waste. In Slovenia, there are not sufficient capacities for the removal of such waste and it is therefore exported abroad for removal. Abroad, various methods for the final removal of such waste are used; the SEA has to include an evaluation of costs connected with individual methods. Within the frame of the SEA, the effect of such costs on the cost-effectiveness of the company has to be evaluated; moreover, an evaluation of the extent of the effect such measures have on small and medium enterprises needs to be necessarily carried out. On the other hand, the analysis has to take into account also the benefits to the companies which perform the decontamination and supply replacement equipment.

The SEA should answer also the question to what extent the additional costs and benefits influence the price of individual products and indirectly the competitiveness of companies. If there are negative effects on the employees' health in companies where PCB-containing devices are being used or stored, the analysis has to take into account the benefits brought to the employees (morbidity, sick leaves, etc.) by the replacement, decontamination and removal of the devices.

Costs and benefits at the local/national level
The foreseen measures for the lowering of risks in the PCB field on the level of state institutions are:

- creating a policy for the collection, management and removal of equipment which contains less than 5 dm^3 of PCB
- organisation of administrative bodies (setting up suitable records, setting up a system for monitoring the plans for the removal of waste PCB),
- organisation of subjects who work in the field of PCB removal,
- setting up and executing systematic monitoring,
- creating a suitable information system and a reporting system,
- informing of and raising awareness of various target groups in the public (companies, local communities, households).

The SE analysis has to include the costs of implementing the foreseen measures together with the foreseen sources for the financing of these measures.

Costs of monitoring the ecologic burdening of the environment with PCB
Since PCB, like all POPs on the list of the Stockholm Convention, are persistent substances with long-term effect on the environment and people's health, a time period and a way of systematic monitoring and reporting on the state of the ecologic burdening of the environment with PCB in Slovenia (air, water, soil, food) need to be determined. Monitoring the said state provides a possibility of evaluating the efficiency of the measures which have been carried out.

Costs of systematic monitoring of PCB contents in foodstuffs and animal feed
Systematic monitoring of PCB contents in foodstuffs and animal feed (both locally produced and imported) is not yet in place in Slovenia. Only the systematic monitoring can on the one hand enable us to follow the efficiency of foreseen measures and on the other hand enable us to prevent further negative effects on people's health with appropriate measures.

Influences on justice
In the evaluation of the just distribution of costs and benefits, an analysis of the responsibility of subjects to carry out the foreseen measures as well as of the sources of financing is needed in the first place. Only on the basis of this information can we determine the effect of the said measures on the distribution of costs and benefits among consumers, companies, local communities and tax payers.

2.3.11.2.3 Unintentionally generated POPs

The extent of the socio-economic analysis in the field of unintentionally generated products is considerably larger than with PCB or pesticides because of the inventorying of dioxins and furans as well as the versatility and complexity of discharges of these substances into the environment. The measures for lowering the discharges are versatile and since they encompass existing companies, they influence various stakeholders (industry, economy, consumers, tax payers, local communities).

Prior to an initial evaluation of the scope of the SEA we need to evaluate also the efficiency of existing legislative and voluntary (if they exist) measures. It is precisely the legislative measures (e.g. mandatory introduction of BAT), the control over companies and the appropriate sanctions, which can ensure successful and efficient cooperation of companies in the lowering and prevention of discharges of POPs substances into the environment.

Given that larger sources of dioxins and furans are to be found in the various methods of waste management (incineration, co-incineration, uncontrolled burning) and in the uncontrolled thermal processes including metallurgy and home furnaces, the SEA has to be created so as to cater to various options or to the combination effects of various measures. In the case of waste management, the SEA has to evaluate also alternative solutions, such as a system of separate collection, composting, recycling and their connection to prevention measures (preventing waste production and the toxic potential of the waste). In connection, costs of informing, raising awareness and education of various target groups also need to be taken into consideration. Both methods of waste management (controlled incineration and alternative options of waste management) need to be compared both from the point of view of positive effects on the lowering of emissions of dioxins into the environment as well as from the point of view of costs and benefits brought by a particular method to various participants, including justice, and the distribution of costs and benefits among the participants. Uncontrolled thermal processes – both industrial and home furnaces – need to be separately investigated and evaluated.

With waste incinerators and co-incineration plants, we need to take into account that these are point sources of pollution and that in this case an evaluation of justice is

especially important (the broader effect of such plants on the surrounding environment, for example the effect on population structure, real property prices, increased morbidity and costs connected with it, etc.).

It can be assumed that the measures will in any case influence the costs and benefits of companies in general (all activities produce waste and therefore costs of waste management), waste management companies (incinerators, co-incineration plants, public utilities companies, recycling companies), local communities (following Slovene legislation they are responsible for waste management), households (waste management costs), and the national budget (measures of information gathering, record-keeping, informing and raising awareness, creating action plans, setting-up of infrastructure etc.).

Individual furnaces present a special problem, however, the scope of the SEA can be more precisely defined only after suitable measures have been formed or an inspection of the efficiency of existing legislative and voluntary measures has been carried out. Since this is connected with the creation of standards for burning devices, the SEA has to include an evaluation of costs and benefits to companies which manufacture, market and service such burning devices; it is connected also with measures for raising the awareness of households and measures for the setting-up and functioning of monitoring, etc.

For the basic determination of the scope of the SEA in the field of unintentional co-products, it is necessary to first ensure more precise information and to:

- carry out a more precise record of the state of dioxins in the environment, which would show both the concentrations and the main sources,
- carry out a review of existing legislative and voluntary measures and an evaluation of their efficiency in the lowering of the emissions of such substances into the environment,
- in the case of planned waste incinerators, alternative methods of waste management have to be considered,
- take into account the costs and benefits of the strategy of awareness raising, education and informing of various target groups (companies, households, individuals, local communities) and the effect of the strategy on the lowering of dioxin emissions into the environment (lowering the amounts of waste, preventing illegal waste incineration, influencing the alternative methods of waste management),
- take into account costs and benefits of an efficient control over waste management, especially with the prevention of unmonitored waste incinerations.

The goal of the socio-economic analysis of the handling and risk management in the field of POPs is a support in the process of deciding. The analysis explicitly shows the consequences of choosing an individual option (of at least two options) among the already taken or the foreseen measures. For the risk management in the field of chemicals, this information includes:

- the nature and characteristics of risks,
- the kinds of legislative and non-legislative measures, which can contribute to the lowering or removal of damage,

- the costs of lowering risks and their redistribution, including the costs to the economy, consumers, legislation and society in general,
- the benefits of lowering risks and their redistribution, which can be connected with positive effects on the environment and people's health or with the increase in innovation and productivity,
- larger commercial potential, competitiveness and economic development, connected with the changes in the policy on risk management.

The purpose of the socio-economic analysis is to evaluate the effect of various options and whether to enforce any measures at all. With the SC, the signing of the Convention alone binds countries to enforce measures for the lowering and prevention of POPs emissions with the goal of a continued minimisation of the emissions and their elimination. With measures which apply to POPs substances formed as unintentional co-products, there are a number of options where the SE analysis should supply the evaluations of costs and benefits of various possible measures (for example, waste incineration or the maximisation of its material use and of the prevention measures).

An assessment of the level of risk is the basis for deciding on what the SEA should encompass and the basis for determining the goals of risk management. The specific goals have to reflect the intentions and the commitments of the performers of measures and the points of view of various interest groups, including an agreement of these groups on the chosen goals. In the framework of establishing the scope of the SEA, it is important to take into account a wide spectrum of potential legislative and voluntary measures.

For each of the chosen options, we need to carry out collection of preliminary data, which would enable an assessment of the technological feasibility, efficiency, economic effects, changes in the environment, health risks and the acceptability to various interest groups. Preliminary data offer the possibility of narrowing down the broad spectrum of measures.

2.3.12 Mechanism for the transmission of suggestions on lengthening the list of POPs

2.3.12.1 Inclusion of new persistent organic pollutants to the Stockholm Convention and their acceptance on the national level.

The legislation of the Republic of Slovenia is in line with the legislation of the European Union in the field of adding new chemicals to the list of the SC.
The goal of creating a mechanism for the transmission of suggestions for the inclusion of additional chemicals to the list of POPs substances is the fulfilment of the provisions of the SC which regulates the cooperation of the public in addressing the issue of new POPs candidates. The purpose of the mechanism is to enable a certain chemical to be suggested for inclusion in the POPs list (in a prescribed form and with determined contents), with the guarantee that the responsible authority for the SC will give a reasoned opinion, in cooperation with other bodies.

The lengthening of the POPs list demands the planning of the steps in the procedure, such as naming the contact person or the working body, determining the structure of the suggestion (information on chemical identity, persistence, bioaccumulation, the

ability to be dispersed over great distances in the environment and harmful effects of the suggested chemical). It includes also the procedure of decision-making, the option of public publishing of the assessment and the suggestion of the decision on inclusion / non-inclusion.

The lengthening of the POPs list is decided on by line ministries (MH, MOP, MAFF, ME) and non-government organisations, at the suggestion of the National Chemicals Office.

3 STRATEGY AND ELEMENTS OF THE NIP ACTION PLAN

3.1 Position of the State

Republic of Slovenia, as Party not only to the Stockholm Convention but also other international conventions, such as the Basel, the Rotterdam, the Aarhus and the Barcelona Convention with protocols, such as the Protocol on Persistent Organic Pollutants to the UN Convention on Long-Range Transboundary Air Pollution, aims to participate in internationally coordinated actions to protect human health and the environment from the effects of persistent organic pollutants.

3.2 Implementation plan

3.2.1 Accession strategy

In Slovenia, the National Implementation Plan for POPs Management under the SC, the EU Regulation on Persistent Organic Pollutants and the POPs Protocol is the responsibility of MZ, which closely cooperated with MOP in preparing this document. In line with the adopted regulations, the Republic of Slovenia is obliged to submit a national implementation plan to the SC Secretariat within two years from the ratification of the Stockholm Convention.

3.2.2 Overview

The Stockholm Convention on Persistent Organic Pollutants is a global environmental treaty for the protection of human health and environment from the adverse effects of persistent organic pollutants.

The Republic of Slovenia signed the Stockholm Convention on Persistent Organic Pollutants on 23 June 2001 and ratified it on 4 May 2004. The Convention entered into force on 17 May 2004. In line with the signed contract, Slovenia has undertaken to submit its NIP to the Conference of the Parties in two years after the ratification of the Convention.

The NIP project was implemented in the period 2003-2006; it was organized by the URSK with the financial support of UNEP.

Given the technical content of tasks, the implementation plan was prepared by the administrative authorities at MOP and MAFF, the experts in chemistry, ecology, medicine and agriculture, and the representatives of NGOs.

Within the framework of the NIP project, all the available information has been collected and evaluated on the manufacture, use, import and export of 12 chemicals treated by the SC. Based on the data on POPs, a review of technical capabilities and the adequacy of the monitoring programme has been made. It provided information on the degree of contamination with POPs in the environment and food, and the impacts on human health. The preparation of NIP involved the groups for raising the public awareness and non-governmental organizations.

On the basis of proposals, the NCC prepared a draft of national action plans, which is an integral part of the NIP, suggesting the short-term, medium-term, and the long-term priorities of the programme implementation.

3.2.3 Realisation of the project

The ongoing project was expected to realize the intended actions for the possible implementation of the identified problems. The realisation will largely depend on the financial input to be provided from the budget of individual ministries (the Ministry of Health, MOP, MAFF), or from the state budget.

3.3 Strategies and Action Plans

The Stockholm Convention regulates international cooperation in protecting the environment and the human health from persistent organic pollutants. The Signatory States have undertaken to ban the production, use, imports and exports; to reduce the emissions of unintentionally produced by-products, to use alternative chemicals or techniques, and to a planned management of POPs stockpiles and wastes. The measures are based on the respect of the precautionary principle[*].

[*] *The precautionary principle is used to protect the environment from the extremely hazardous substances. Where there is a risk of serious and irreversible adverse effects, lack of scientific evidence should not be the reason for postponing measures to protect the environment and the human health.*

By signing the Stockholm Convention, Slovenia has undertaken to prepare and implement the National Implementation Plan for the management of persistent organic pollutants. Within the framework of the project, data have been collected on the production and use of all 12 POPs substances in the past, and on the state of the environmental pollution. Information on the current state of environmental pollution with POPs are the basis for planning further activities for the protection of the environment and the health of the Slovenian citizens.

As in other EU countries, Slovenia conducts a number of activities to protect the environment from POPs substances. Information on the production and use of all 12 POPs substances in the past has been collected and serves as a basis for planning the protective measures. The main sources of emissions are being systematically removed, which is already reflected in a gradual reduction of POPs substances in the environment. The remaining problem is the area of the river Krupa, where elevated PCB levels are still observed at heavy rains. Information on diffuse sources of POPs which have not been registered yet is still being collected. Occupational exposure to POPs substances in Slovenia does not represent major cause of concern.

Given the current situation, the priorities of the Republic of Slovenia for the protection of the environment and the human health from POPs wastes are the measures:

- to reduce the PCB exposure of the population in the area of the River Krupa,
- improve the application of legislation related to POPs,
- further reduce POPs emissions into the environment,
- research of the POPs effects on human health; research of the POPs burden on the population; identification of links between the burden and the impact,
- establish a central information system on POPs in the RS,
- inform the people about POPs and their effects on the environment and the human health,
- join international activities related to POPs.

Based on the selected priorities of the Republic of Slovenia for the protection of the environment and the human health from POPs substances, strategic objectives are set out in various areas of protecting the environment and health, and action plans are prepared for each area. The strategic objectives and planned actions to achieve these objectives are presented below. The planned measures will guarantee reduced exposure to POPs substances, and thus a healthier environment in line with the recommendations of the Stockholm Convention.

3.4 Action plans with the envisaged measures

3.4.1 Action plan: Institutional and legislative reinforcement

The legislation of the Republic of Slovenia on pesticides, chemicals, environmental protection and other fields resumes the entire *acquis* of the European Community and specifies the powers and duties of line ministries and other institutions.

PPP with POPs substances are a specific category which requires the cooperation in various technical and legislative areas. The authority over PPP with POPs substances can be attributed to the MAFF and the Ministry of Health. This concerns substances whose production, marketing and use in the Republic of Slovenia is not allowed for quite a long time, but the remaining problem is waste, unusable stockpiles and a potential environmental contamination, which is under the jurisdiction of MOP.

PCB control of is under the jurisdiction of MOP. The use of PCBs in Slovenia is limited to registered electrical devices, where for economic reasons, they are not replaced before the end of their working life. This concerns old electrical transformers and capacitors, which the companies will replace at the end of their working life, and in any case within the legal deadline by 2010. A special operational programme conducted by ARSO, is prepared fro their removal. Strategic guidelines of waste management in Slovenia envisage the site, quantitative and qualitative determination of non-point sources with PCB and illegal dumps of PPP with POPs substances.

The implementation of measures to reduce and finally eliminate releases of unintentionally produced POPs from anthropogenic sources, especially PCCD/PCDF, must be based on emission levels data for the main emission sources. As Slovenia does not have these records, it will have to elaborate them first, and then initiate the implementation of measures imposed by the SC.

Short- and medium-term measures

The national legislation has to be coordinated with the EU legislation and the requirements of the SC.

Monitoring of emission sources of unintentionally produced POPs has to be ensured. It has to be done by applying technical guidelines for assessing landfills with POPs waste (conclusion of the 7th meeting of the Conference of the Parties to the Basel Convention).

It is necessary to review the situation with regard to POPs substances content in soil, and measures for the needs of the organic and integrated agricultural production.

The legislative measures include:

- drafting of regulation related to the emission of substances into air from crematoria and ovens for the incineration of animal carcasses,
- Determining the lowest possible quality of fuels for small and medium-combustion plants,
- Increasing control over the ban on private waste incineration in households and outdoors,
- Preparing the operational programme of hazardous waste management,
- updating the operational programme for the treatment of PCBs and PCTs
- updating the operational programme management of waste oils;
- stricter control and increased penalty for discharges into sea and inadequately equipped ships,
- determining personal responsibility of marina heads for violating the environmental requirements, and issuing licenses,
- Increased control over the operators of waste incineration, chemical industry, metal production, power plants and cement plants.

Representatives of the Ministry of Health and the Ministry of Agriculture, Forestry and Food actively participate in the Commission working groups which tackle the issues of food contamination with POP pollutants.

3.4.2 Action plan: production, trade, use, stocks and PPP waste with POPs (Annex A, Part 1 - Chemicals)

In the Republic of Slovenia, only one company produced plant protection products with POPs active substances. The production consisted of materials like aldrin, dieldrin, DDT, and endrin. Given the prohibitions and restrictions on the use of these substances, their production was also abolished and in the seventies, while the last one, endrin, was banned in 1989. Today's legislation fully prohibits their production and use in marketing.

The overview of the situation showed that PPP substances with POPs were not intensively used in Slovenia. This is demonstrated by the rare occurrence of POPs substances in soil or water. Based on the experience of experts, the most frequently used substances were DDT as powder, and endrin, but there are no data on the actual quantities consumed in Slovenia. There is still the issue of illegally deposited PPP with POPs substances. The goal of the action plan for the sphere of PPP with

POPs substances is a system that would prevent harm from the old burdens and entry of new chemical substances into the SC scope of measures.

Short- and medium-term plans

From the point of view of protecting humans and animal, and the environmental protection, and in the light of the SC implementation it is necessary to define and accurately locate the old PPP loadings with POPs substances (households, farms, environment).

A plan should be examined and developed according to the results of the inventory of old stock of PPP with POPs substances from the sellers and agricultural holdings for their collection, removal and safe destruction.

More frequent regular collection of hazardous waste should be organized at the local level and adequate collection points provided in all municipal waste landfills.

Long-term measures

Based on the identified locations of illegal dumps and other irregular deposits of PPP with POPs substances, assessment on the state of environmental pollution by POPs substances and recovery plans for each location have to be prepared.

Remediation of illegal dumps and other irregular waste deposits of PPP with POPs substances has to be performed in line with the rehabilitation plans.

3.4.3 Action plan: production, import, export, use, identification, labelling, removal, storage and disposal of PCB and the equipment containing PCB (Annex A, Part II, Chemicals)

In Slovenia, the use of PCBs in technical processes was forbidden already in 1985. The import of raw materials with PCB was then suspended, while the remaining raw materials and waste began to be exported for disposal. Some old facilities with PCB as dielectric (capacitors, transformers) still operate; they are recorded (ARSO, MOP) and can be used until 2010.

Short and medium term plans

Inventory will have to be set up and the recovery of non-point sources of PCBs carried out within the MOP operational programme, and control of diffuse PCB sources, waste collection and illegal dumps provided.

It is important to establish updated records of PCB equipment in use, in temporary storage and export to landfills, and inform the public thereof.

PCB monitoring will have to be continued for all environmental elements, waste and foodstuff.

Regular maintenance and control of the deposit of PCB capacitors at the factory Iskra Semič will also have to be provided. Halogenated compounds are permissible means for fire-fighting (fillings of fire extinguishers and possibly elsewhere). At high temperatures and intense oxidation processes taking place in fire-fighting, PCB, dioxins and other by-products are generated; such use is therefore dangerous for health and inappropriate for this purpose. It is necessary to record the amount of these means in use and trade. Fire extinguishers and other tools containing

halogenated flame retardants will be removed from the market, and an organized and safe disposal provided.

The experience of the neighbouring countries shows that in the period of allowed PCB production and use, these substances were used in construction, therefore elevated concentrations of PCB may be found in the atmosphere of such buildings constructed before 1985. A list of buildings constructed during that period has to be drawn, and measure the PCB presence in air. It would be reasonable to use the experience of the countries which such a procedure was either carried out or is in progress.

Long-term measure
Preparation of the strategy for a full rehabilitation of the landfill with PCB waste at the factory Iskra Semič constructed in 1985.

3.4.4 Action plan: manufacturing, transport, use, stocks and DDT waste (Annex B, Chemicals)

The Republic of Slovenia produced PPP which contained DDT only in small amounts. Both the production and the use of these substances have been prohibited since 1972. Nevertheless, beside the survey among traders and agricultural holdings which showed the residues of PPP with POPs substances, there is a possibility that substances which contain DDT, still exist as unusable old stockpile either in farms or in households.

The issue of DDT is therefore included in the plans related to PPP containing POPs substances.

3.4.5 Action plan: Generation of unintentionally produced PCDD/PCDF, HCB and PCB

Slovenia does not have complete records of emission sources and data on releases of unintentionally produced POPs into air. There were only individual measurements of dioxins/furans in the environment elements and food products. Even during the preparation of NIP project there was a proposal to elaborate the study entitled "Regulation of control over the emissions of unintentionally produced POPs: PCCD/ PCDF, PCB, HCB and PAH." The results of the project will serve as a basis to introduce control of the POPs emissions into the environment in line with the requirements of the Stockholm Convention.

Short-term measures:

Elaborate inventory of emissions and introduce control of unintentionally produced PCCD/PCDF, PCB and HCB in Slovenia at the following possible sources:

- the existing incinerators, including co-incineration of municipal, hazardous and hospital waste,
- cement plants upon co-incineration of hazardous waste,
- thermal processes in the metallurgical industry,
- production of pulp in technological processes of bleaching pulp with chlorine.

Introduce control of POPs in solid waste sludge from the biological treatment plants: Based on the current review of emissions of unintentionally produced POPs, a list of priorities and proposals to reduce POPs emissions should be drawn up. Establish a mechanism to identify and draw up inventory of new sources and releases of these chemicals into the environment, including regular annual records. Assess the efficiency of the existing rules and measures governing POPs discharges, and update them. Educate general public about the harmful effects of POPs on human health and the environment, and plan a time scheme for updating the implementation of NIP with a review of the new situation after a five year period.

Specific tasks resulting from short-term measures:

The activities are divided into 3 sections, namely: identification of sources, reduction of emissions and raising the awareness on the possible transmission routes.

1. Identification of sources:

   - in the existing incinerators, including co-incineration of municipal, hazardous and hospital waste,
   - in cement plants upon co-incineration of hazardous waste,
   - thermal processes in the metallurgical industry,
   - production of pulp in technological processes of bleaching pulp with chlorine,
   - analysis of sewage sludge and assessment of POPs emissions from sewage sludge,
   - identify releases of POPs from the residential combustion appliances,
   - determine the emissions of POPs from outdoor burning of waste,
   - determine the annual emissions of POPs due to natural and other disasters,
   - preparation of questionnaires for drawing up the inventory of unintentionally produced POPs,
   - implementation of a survey on unintentionally produced POPs,
   - re-calculation and use of new tools based on data for 2005.

2. Reducing the emissions of unintentionally produced POPs:

   - prepare incentives to improve internal monitoring of POPs (by 2010),
   - improve internal monitoring of POPs pollutants in the production of pulp and paper (by 2010),
   - improve internal monitoring of POPs pollutants in the metallurgical industry (by 2010),
   - improve internal monitoring of POPs pollutants in the chemical industry (by 2010),
   - improve internal monitoring of POPs pollutants at incineration and co-incineration of waste (by 2010),
   - improve internal monitoring of POPs pollutants in the combustion of biofuels (by 2010).

3. Improve the knowledge and information on emissions, dispersion sources and exposure, and possible tracks of unintentionally produced POPs:

   - Survey of unintentionally released POPs in thermal processes in large and small appliances,

- determination of the sources of POPs and the necessary measures.

Long-term measures

Introduction of change and strategy in technological processes to reduce the POPs emissions in all environmental elements, waste and products.

In planning new industrial plants, prevent the creation of new sources of emissions of unintentionally produced products into the environment by introducing environmentally friendly technologies - the use of BAT/BEP.

3.4.6 Action plan: Identification of stocks, products in use and waste: DDT, HCB (Annex A, B, C, Chemicals) - The plan for the evaluation and prevention of releases from stockpiles and wastes (Annex A, B, C, Chemicals)

The identification of stocks of products and potential PPP with POPs substances in use is almost completed. More issues are open in the field of PPP waste with POPs materials, or as regards the location of unused and waste pesticides in the past when their prohibition entered into force. We assume that some of these substances also ended on municipal waste dumps.

Short- and medium-term measures

Based on the identification of old burdens and consequences of pollution by POPs substances with PPP, it is necessary to establish or update the database on the state of environmental stress from PPP with POPs substances. Such information will enable a constant, online informing of a broad public.

Transparency and access to online information stated above paragraph serves as a basis and is a prerequisite for design and implementation of appropriate procedures for the removal or destruction of old stocks of PPP with POPs substances.

Concrete data on the quantities of unused PPP with POPs materials deposited in municipal landfills in the past are not available. In order to make an assessment, it is reasonable to conduct a review of the pollution of water courses and groundwater near the former and still operating landfills of municipal and hazardous waste, in particular those which are known (or suspected) to be subject to contamination, as well as those in the vicinity of intensive agricultural areas.

The effective operation of removal, destruction and rehabilitation, and in the cases of newly identified critical points, a standard action procedure should be defined, including the terms of procedure and modes of financing.

Long-term measures

Based on the review of the watercourses pollution and in line with the standard action procedure to carry out remediation and the action to prevent further releases of PPP containing POPs substances from waste.

3.4.7 Action plan: Identification of contaminated areas and proper handling (Annex A,B,C, Chemicals)

Old landfills and packaging of plant protection products with POPs pesticides were possible sources of environment pollution in the past. These locations need to be recorded and restored (Kozoderčeva jama, Jama proti Brunšvigu, Križna jama, former military areas, etc.)

In Slovenia, the production of condensers with PCB as the dielectric resulted in the pollution of the environment in the area of the Semič municipality, due to inappropriate waste management and unmonitored releases. The waste repository was restored, but PCB remains in the subsoil of the karstic terrain and is sporadically washed by meteoric precipitation into the Krupa river. Monitoring of PCB is still being carried out in the surroundings. The results from the previous years show a potential possibility for sporadic contamination of the Krupa river, while with the other elements of the environment, PCB does not exceed the permitted limit values.

Short-term and medium-term measures

The preparation of a review of the most important old burdens of PPP with POPs substances and the creation of a suggestion for the steps in the restoration and the ways of financing.

The continuation or the establishment of the monitoring of the remains of PPP with POPs substances in the soil of intensively farmed areas.

The preservation of the regular monitoring of PPP with POPs substances in locally-produced foodstuffs, agricultural crops and animal feed, which can be a consequence of environment pollution. Thus acquired data are an important indicator of soil pollution.

The inclusion of the operating instructions in cases of presence of PPP with POPs substances into the standard procedures of action.

The long-term monitoring of the state of the environment in the area of the Semič municipality with the measurements of dioxins/furans.

Long-term plan

Carry out a comprehensive review of the areas polluted with POPs and draw a preliminary assessment of risk to people’s health and the environment. It is recommended that this assessment be used in further analyses of risk so that the needs for decontamination can be evaluated considering the criteria of economical use. The acquired experience can be the basis for the planning of procedures with newly discovered polluted areas (old burdens).

In planning the restoration of new contaminated areas, use experience and results of the long-standing research in the polluted area of Semič with the use of a system of modelling.

Give priority to in-situ methods of restoration (e.g. ecoremediation), to lower the risk of polluting during transport.

Prevent the generation of new ecological burdens on the environment.

3.4.8 Action plan: Strategy in data exchange

Informing in the field of POPS means the collection, creation and passing-on of data and information from the field (emissions, imissions, state of pollution, steps taken by various participants, efficiency of measures), with the intention of including various participants important to the efficient prevention and reduction of POPs emissions.

Short-term and medium-term measures

Establish a central information centre for POPs which will work under the NCB (MH), with the goal of monitoring and collecting data on POPs, strive for the reduction of POPs, their prevention and abandonment in the industry and other fields of activity.

Establish a professional interministerial commission for POPs, which will lead and direct the execution of action plans in the frame of the NIP, take on the role of the professional advisory body for the support of the execution of the NIP, coordinate the activities for the establishment of the legal and institutional system for the collection of suggestions and deciding on the lengthening of the list of POPs, and prescribe the procedure for the introduction of new POPs.

Design a national Internet portal for POPs and establish a comprehensive and regularly updated presentation of data and information on the SC, POPs, the state of the environment in Slovenia and abroad, on the sources of emissions and their influences and effects, on the possibilities of measure-taking and on the efficiency of these measures. The purpose of the portal is to enable access to data and information on POPs for the widest public and other participants who need these data.

The following institutions are responsible for the functioning of the national Internet portal: National Chemicals Office (MH) as the administrator of the Internet portal, in cooperation with the Environmental Agency of the Republic of Slovenia (MOP), inspectorates, public institutes and other bodies and institutions which collect and publish data on POPs substances.

Strengthening of the cooperation among all responsible line ministries and institutions in the field of collecting data, deciding on measures and carrying out the restoration processes connected with POPs.

Integration and accessibility of data on the level of burdening of the environment with POPs substances, from the monitoring of individual elements of the environment, crops and products (foodstuffs, agricultural crops, animal feed) in the collection and evaluation of the data.

3.4.9 Action plan: Raising public awareness, informing and education

Raising public awareness

Raising awareness in the field of POPs means such targeted behaviour which would help the key stakeholders and the target public population critically assess and recognize their own and other's actions and opinions, with the intention of shaping a responsible attitude towards them.

Citizens of the Republic of Slovenia need to be informed of POPs substances in a manner which will enable them to recognize potential hazards. In the first place, it is important to inform the public of ways of being exposed which can be reduced with knowledge and deliberated actions, since they are a consequence of eating habits and life-style. Citizens of the RS must have enough information at their disposal that they can make independent decisions.

Doctors and other health workers need to be informed of POPS substances and their effects. They have to have detailed knowledge of the consequences of exposure to POPs substances and of ways for the reduction of the exposure. They have to be encouraged to participate actively in raising the awareness of their patients on the hazards of POPs substances and of actions which would reduce the exposure. Families with children and mothers-to-be have to be given advice on the potential hazards of consuming polluted fish and meat products.

To achieve goals of raising awareness efficiently, it is important to use contents and methods adapted to the abilities of comprehending and the needs of individual target groups.

<u>Preparing leaflets and brochures</u>

The purpose of preparing a series of leaflets and brochures is to pass on information to the widest possible public and to specific target groups. The leaflets and brochures are prepared in such a way that the prepared contents can be used also on the national Internet portal on POPs.

The purpose of preparing the listed materials is, in the first place, to raise the awareness on the subject and the problems connected with POPs.

The following publications need to be prepared:

- a general brochure or leaflet with a brief introduction of POPs substances and of the Stockholm Convention
- a leaflet with the introduction of individual POPs or groups of POPs (PCDD/F, PCB, pesticides), intended for the wider public (households) or individual target groups of the public (journalists, teachers, pupils, non-government organisations, health workers, workers in various fields, young women).

<u>Preparing a website on POPs substances</u>

The website on POPs substances will be accessible to the entire public. Its purpose will be to inform on POPs substances, their effect on the environment and people's health and to exchange information.

Preparing an educational meeting with the journalists on POPs
The goal of the educational workshop is to present to journalists the content and the demands of the Stockholm Convention as well as the state and the emission sources in Slovenia, the effects of individual POPs on people's health and the environment and what are the possible measures for the prevention and reduction of POPs emissions.

The purpose of the workshop is to achieve recognition and understanding of the POPs problem area in Slovenia among journalists and to reduce the possibility of incorrect reporting on the subject in the media.

Education

Preparing an educational programme for selected target groups of the public
Preparing an educational programme on the topic of POPs for the journalists, non-government organisations from the field of environmental protection, non-government organisations and associations from the field of the protection of women and children, economic interest groupings, local communities and workers from the field of education and schooling, with the intention of introducing the content and the demands of the Stockholm Convention, the state and the emission sources in the Republic of Slovenia, the effects of individual POPs on people's health and the environment and, in the first place, the possible measures for the prevention and reduction of POPs emissions into the living environment.

Preparing educational materials for various target groups of the public
Preparing educational materials for various target groups of the public within the context of the preparation for the educational programme; the materials can be used for the execution of education outside the context of activity of the information centre for POPs.

Inclusion of users of POPs substances into a programme of regular education on the handling of hazardous substances and their effects on people and the environment.

Information

Information in the field of POPS means collection, creation and distribution of data and information from this field (emissions, imissions, situation, steps taken by various participants, efficiency of actions), with the intention to reach various participants relevant for an efficient prevention and reduction of POPs emissions.

Setting up a national Internet portal on POPs (NSP)
The goal of the national Internet portal on POPs is to establish a comprehensive offer of data and information on the Stockholm Convention, POPs, the state in Slovenia and abroad, the sources of emissions, their influences and effects, the possibilities of measure-taking and the efficiency of these measures.

The purpose of the national Internet portal is to enable access to data and information on POPs for the widest public and the stakeholders who are important in the reduction and prevention of POPs emissions.

The NSP provides data and information on POPs, the legislature, emission and imission, the exposure of people, the levels of POPs in the human tissue/environment, bioaccumulation, trends of ecotoxicity, sources of pollution (point/non-point), links with EPER/IPPC and methods for the reduction and prevention.

Preparing a communication strategy for public relations
The goal of the communication strategy is to establish a clear frame for disseminating the messages and ways of reaching the public concerning POPs.

The intention is to achieve the goals of the implementation plan in the fields of raising awareness, informing, cooperation and education.

The contents of the communication strategy are the contents on the situation, the goals, the goals of the public and the stakeholders, the fundamental messages, the ways of transmitting messages and reaching the public as well as the foreseen effects.

Cooperation

Drawing up mechanisms to submit proposals for extending the list of POPs
Cooperation in the field of POPs means to enable the public to take part in the discussions on POPs, their effects on human health and environment, and to draw up appropriate measures and policies for the application of the Stockholm Convention.

The goal of creating the mechanism for the transmission of suggestions for the inclusion of additional chemicals to the list of POPs is the fulfilment of the Stockholm Convention which regulates the cooperation of the public in the discussion of POPs.

The purpose of the mechanism is to enable the public to suggest a certain chemical (in a prescribed form and content) for inclusion in the POPs list, with the guarantee that the responsible authority will give a reasoned opinion on the suggestion.

The structure of the mechanism:
- the contact person or the working body,
- the formation of the suggestion,
- information on chemical identity, persistence, bioaccumulation, the ability to be dispersed over great distances in the environment and harmful effects,
- the procedure of decision-making,
- the public announcement of the assessment and suggestion of the decision on inclusion / non-inclusion.

Problem workshops
The goal of problem workshops is to call the attention of the target publics to the measures for the prevention and reduction of POPs emissions.

The purpose of the workshops is to inform the target publics, to increase their responsiveness and to make the accepting of reasoned decisions, connected with changes in production processes, easier.

Problem workshops are prepared for the following topics:
- thermal treatment plants,
- chemical plants,
- waste management (unmonitored incineration, sewage sludge),
- new technologies in the handling of POPs,
- precursors, alternatives and measures,
- monitoring of production processes.

Creating the mechanism for the cooperation of the public in the creating of measures and activities

The goal of the mechanism for the cooperation of the public is to ensure the public to have the possibility of participation and decision-making in connection with the topic of POPs. The intention is to increase the responsiveness of the public and for it to take on the responsibility for taking measures in the field of POPs. In doing so, the principles of timeliness, openness, accessibility, responsiveness and transparency have to be observed.

The minimal demands for the involvement of public include:
- efficient informing on the process and contents,
- clear procedures of cooperation,
- a known time schedule,
- taking account of the results from the cooperation of the public.

Training

Training in the field of POPs is intended primarily for those stakeholders who can directly influence the formation and execution of measures for the prevention and reduction of releases as well as the use of precursors for the creation of POPs, that is, primarily the known pollutants.

Support of the IPPC centre

The IPPC centre functions as a support for the activities of the existing IPPC liable persons. The goal of the support is to connect the capabilities in the field of POPs and optimise the measures for the prevention and reduction of POPs emissions. The purpose of the cooperation of the IPPC centre and the RS Government Advisory Centre is to support the acquisition of environmental protection permits.

3.4.10 Action plan: Monitoring

Systematic monitoring of POPs substances in different segments enables the assessment of the risks of the population's exposure to these substances.

In terms of the protection of health of the population of Slovenia there is a need to monitor the presence of POPs substances in order to prevent the intake of these substances through food, to assess and monitor the exposure of the population to POPs substances in the environment, to assess and monitor the burden on the population from POPs substances, and to monitor the human health indicators.

Monitoring POPs substances will achieve its objectives only through an efficient use of data, their evaluation and reasonable interpretation.

Short- and medium-term measures

MZ, MOP and MAFF update the existing regular monitoring with the requirements under the SC. To this end, the Ministries establish contacts and prepare a joint proposal. The starting point of integrating the monitoring system is the effective use of invested funds, and the creation of viable information system as a basis for predicting the risk and the links with the activities of the ministries (MOP, Ministry of Health, MAFF) and the Government in the protection of health and the environment.

In planning the research programmes and monitoring programmes, priority should be given to development and optimization of monitoring in line with the SC commitment. The URSK puts in place monitoring of POPs substances in humans and organisms.

The Ministry of the Environment and Spatial Planning is competent for monitoring of all environmental elements, where the programme of imission and emission monitoring is already underway following the existing regulatory system which undertakes international standards and commitments to evaluate the situation and changes in the environment for PPP with POPs substances and PCB, therefore it has the following duties:

- *to establish a concept of long-term POPs monitoring, taking into account the existing activities in other ministries, to continue participation in international activities and engage in new activities, prepared by the EU.*
- *to review the activities under its jurisdiction, systematically develop long-term monitoring, the necessary research and pilot studies aimed at evaluating certain issues which open new areas to put in place the monitoring.*
- *Associate all the activities with international monitoring programmes and monitoring systems prescribed by international conventions and protocols, including, other national activities.*

The MOP will prepare, in cooperation with the Ministry of Health and MAFF, an upgrade of monitoring programme based on the experience from international monitoring programmes. The POPs issues have to be connected with other monitoring parameters.

Following the closure of barracks and the departure of the Yugoslav Army from Slovenia, a list of warehouses containing POPs needs to be made. Since many pesticides was used by the Army (DDT), an inventory of illegal dumps should also be made in areas of the former military barracks where other waste than pesticides could be found that contain hazardous substances. The use of smoke bombs can be a source of unintentional POPs. Therefore the Ministry of Defence prepared a special plan to reduce emissions from the use of smoke war material and organized additional air monitoring in the course of military exercises with the emphasis on monitoring POPs emissions caused by defensive activities during peacetime

Long-term measures

Implementation of monitoring in line with the adopted concept.

Specific proposals for monitoring the measures in the NIP report

Continue regular POPs monitoring in different elements - water, soil, air and food, agricultural products and feed of domestic origin.

Systematic review of residue levels of POPs substances in the soil of intensive agricultural areas in Slovenia with the aim of a clear definition of the Slovenian soil quality for agricultural use.

Determination of air contamination as a possible origin of indirect pollution, even from very distant sources.

Establishment of regular monitoring of POPs in marinas.

Improving the reporting of the quantities and structure of waste and their contamination with POPs.

Selection of relevant data from the existing state monitoring and their transfer to the data base.

Updated statistical processing and expert analysis of the collected data and their publication on the website.

3.4.11 Monitoring and studying the effects of POPs on human health in the RS

The impact of POPs substances on human health depends on human exposure to these substances in the environment. The assessment of exposure to POPs substances in the environment was enabled by epidemiological studies of stress on the population. In Slovenia, monitoring of the health state of the population which was exposed to higher values of POPs substances, helped to establish the consequences of exposure to these substances in the past, an their adverse effects on human health. Due to a small number of exposed persons and the specificity of the effects of POPs substances, the results of such studies are often unspecific, and have to be interpreted with caution.

Epidemiological research and data

- Acquisition of data on the burden of the population with POPs - current status, trends; address specifically the population in a polluted area of the Krupa River. Indicators: breast milk, fat, milk teeth, introduction of modern methods of assessing exposure.
- Assessment of the impacts on the health of employees in enterprises which still in use or store the equipment containing PCBs.
- Long-term effects of PCBs on human health and the associated costs.
- keeping data on the burden of the population with POPs, tracing the dynamics of the load (evaluation of effective protection of the population), and public information (recommendations); determining the content of D/F toxic equivalents per gram of fat for the Slovenian population, determine the value of daily D/F intake by food in Slovenia.

Tracking the health status of the population or diseases that may result from the exposure to POPs substances in the environment - miscarriage, premature birth, low birth weight, neurological disorders, immune disorders, thyroid disease, reproductive disorders, genetic diseases - detection of potential risks to reproductive health.

Scientific research of POPs effects on the health of living organisms

- Relationship between the POPs exposure and health in various environments – at work, at home and in different age groups.
- development and detection of efficient indicators of the population burden by POPs substances.
- In vitro controlled research - genotoxicity, hormonal effects, immunotoxicity, reproductive effects, neurotoxicity.
- Research on the effects of POPs exposure *in utero* and in childhood.
- Research on the properties of new chemicals to be included on the list of POPs and their impact on health.
- Economic assessment of the effects of population's exposure to POPs:
    - long-term effects of PCBs on human health and the associated costs,
    - Assessment of impact on the health of employees in the companies which still use or store equipment containing PCBs and the associated costs for businesses and the community.

- Joining international activities and projects related to POPs effects on human health; participating in harmonized international research studies.

At present, assessing the economic impacts of various adverse factors and measures for their removal is of great importance for policy-makers who decide on the implementation of a particular action also on the basis of this information.

3.4.12 Action plan: Reporting

The Republic of Slovenia is committed, in line with Article15 of the Stockholm Convention on Persistent Organic Pollutants, to report on the:

- measures taken to implement the provisions of this Convention and on the effectiveness of these measures in meeting the objectives of the Convention (reports to the Conference of the Parties),
- statistical data on the total production, imports and exports of each of the chemicals listed in Annex A and B, or a reasonable estimate of this information and a list of countries from which it has imported such substances, and the countries in which it has exported any such substance (the Secretariat)

at regular intervals and on the forms provided by the Conference of the Parties.

Responsibility: MH (URSK)

Cooperation: MOP, MAFF

2. The RS must adopt measures for reducing total releases from anthropogenic sources of each chemical listed in Annex C of the Stockholm Convention, in order to minimize total discharges or ultimately eliminate them, where feasible.

Responsibility: MH, MOP

Cooperation: MAFF

Proposals for the improvements of the existing reporting system

Considering the above findings, the following tasks have to be performed for implementing the provisions of the Stockholm Convention:

U-P1	Determine the obligation of providing reports of monitoring and other administrative procedures with relevant information on POPs to the Information Centre for POPs.
U-P2	Complete the legislation governing monitoring reports with the indication of Gauss-Krueger coordinates of the sources of emission (where this has not been prescribed yet).
U-P3	Analyse the implementation of operational monitoring of POPs by the liable persons.
U-P4	Set up an expert commission to participate in the assessment of measures for reducing environmental burdens in the process of obtaining environmental permits.

Competence in the field of persistent organic pollutants in the Republic of Slovenia

The MZ and the MOP have certain responsibilities and tasks related to POPs in line with the regulation on POPs. The tasks are listed in Table 3.

The current administrative system does not provide for specific reporting on POPs. Data and information collected under different imission and emission monitoring procedures are fragmented. They are collected from annual reports by MOP, liable persons or managers. The methods, periods and frequencies of reporting for each type of monitoring, including the POPs, are very different; they are defined either by administrative procedures or the reporting can be related to the entire EU area, which was an obligation upon assuming the EU legislation.

Table 29: Reporting

Obligation	Description of requirements	Priority
Measures for reducing or eliminating releases from unintentional production (Article 15, paragraph a)	Develop an action plan or, where appropriate, a regional or subregional action plan and subsequently implement it as part of its implementation plan specified in Article 7, designed to identify, characterize and address the release of the chemicals listed in Annex C of the Stockholm Convention.	Within two years of entry into force of this Convention
Measures to reduce or eliminate releases from unintentional production (Article 15, point a, point (V))	Review the strategies and their success in meeting the obligations; the strategies and their success in meeting the obligations - develop an action plan or, where appropriate, a regional or a subregional action plan for identification, characterization and determination of unintentionally produced POPs listed in Annex C; such reviews shall be included in reports submitted pursuant to Article 15.	Every five years
Implementation / National Plan (Article 7)	The country is obliged to develop and endeavour to implement a plan for the implementation of its obligations under this Convention and, as appropriate, review and update its implementation plan on a periodic basis and in a manner as specified by a decision of the Conference of the Parties.	The RS submits its national plan to the Conference of the Parties within two years from the date of entry into force of this Convention for that Party.
Reporting (Article 15)	The RS is obliged to report on: - the measures it has taken to implement the provisions of this Convention and on the effectiveness of such measures	To be reported at periodic intervals and in a format to be decided by the Conference of the Parties at its first meeting.

	in meeting the objectives of the Convention (report to the Conference of the Parties); – the statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data and a list of the States from which it has imported each such substance and the States to which it has exported each such substance (report to the Secretariat).	
Effectiveness evaluation (Article 16)	In order to facilitate such evaluation, the Conference of the Parties shall, at its first meeting, initiate the establishment of arrangements to provide itself with comparable monitoring data on the presence of the chemicals listed in Annexes A, B and C as well as their regional and global environmental transport. These arrangements should be implemented by the Parties on a regional basis when appropriate, in accordance with their technical and financial capabilities, using existing monitoring programmes and mechanisms to the extent possible and promoting harmonization of approaches; they may be supplemented where necessary, taking into account the differences between regions and their capabilities to implement monitoring activities; and shall include reports to the Conference of the Parties on the results of the monitoring activities on a regional and global basis at intervals to be specified by the Conference of the Parties. The evaluation shall be conducted on the basis of available scientific, environmental, technical and economic information, including: reports and other monitoring information provided pursuant to paragraph 2; national reports submitted pursuant to Article 15; and non-compliance information provided pursuant to the procedures established under Article 17.	The Conference evaluates the effectiveness of this Convention commencing four years after the date of entry into force of this Convention, and periodically thereafter at intervals to be decided by the Conference of the Parties,
Annex A, II.D, paragraph g	Provide a report every five years on progress in eliminating polychlorinated biphenyls and submit it to the Conference of the Parties pursuant to Article 15.	Every five years
Annex B, II.D, point 4	The RS which uses DDT shall provide information every three years to the Secretariat and the World Health Organization on the amount used, the conditions of such use and its relevance to the RS disease management strategy, in a format to be decided by the Conference of the Parties in consultation with the World Health Organization	Every three years

3.4.13 Activity: A Strategy for Research and Development

Slovenia needs to promote scientific research and development, monitoring and cooperation on POPs substances and support international development programmes. The Slovenian scientists should be involved in international projects to research POPs substances and to explore new POPs substances.

Slovenia has a potential to study the effects of PCBs on the health of residents in the area of the Krupa River who were exposed to higher doses of PCBs compared to the population of other regions.

The central need of Slovenia in the field of POPs substances is to review the population burden with PCBs and dioxins. The inventory showed that Slovenia does not have data on the average values of the quantities of PCBs and dioxins, which are present in tissues. In 2005, a pilot monitoring was carried out of certain POPs substances in the samples of human blood and human milk and in the tissues of selected indicator species of wild animals that are part of the food chain in Slovenia. Data showed exposure of the Slovenian population to these substances and the situation in the exposed part of the SE Slovenia. Biomonitoring is expected to be continued in 2007. More attention should be devoted to the vulnerability of the

youngest population and the planning of any special measures for the protection of health, which is the central objective of the SC. The survey and its periodic updating should facilitate the establishment of the current status and trends of this exposure, and appropriate recommendations should be prepared.

In the context of developing NIP, the sampling of the brown bear tissue has been carried out. Thanks to this possibility in Slovenia, the knowledge and the existing analytical equipment, a preliminary research of dioxins and PCBs in three samples of tissue was carried out. The results, though preliminary, have been well received. With continued research, Slovenia can contribute to a global knowledge on the burden of animal tissue with dioxins and PCBs.

Due to improper disposal of equipment and materials which contained PCBs in Bela Krajina, it is necessary to continue the research on the burden of human tissues and breast milk with PCBs and dioxins/furans population.

Data on the exposure of the human population to PCBs and dioxins are necessary for a coherent and grounded participation of Slovenia in international activities for reducing the environmental burden of POPs. Slovenia has to join international trends for evaluating transboundary transmission of POPs substances which is an important leverage for achieving the goals of reducing the emissions of POPs substances within a particular country. An appropriate survey should be initiated to identify the Slovenian contribution to the long-range pollution with POPs substances.

Due to international pressure to replace some of the still permitted PPP with POPs properties, we can expect new compounds on the list of restrictions provided by the SC. As a member of the EU, and with the presence of its representatives in the professional bodies, Slovenia will timely perceive potential candidates for the inclusion in the list of the Convention. With regard to these substances, we have to anticipate adequate replacement and envisage socio-economic implications of the SC requirements, and define our position in the process of including new substances to the list of SC.

For the purpose of the appropriate technical discussion on the scope of risk and the adequate actions under the SC related to the inclusion of new compounds, our own knowledge has to be promoted to be able to defend our views. We have to ensure timely start of national surveys of the potential pollutants identified in the Republic of Slovenia, and research the properties and impacts of the proposed new substances, POPs candidates. For this purpose, our own experts need to be trained for a quality participation at national or international levels.

As regards new POPs candidates, Slovenia must timely complete the programme of training the sellers and end users of these substances.

Mutual information and coordination of activities of the professional and administrative bodies, NGOs in the field of environmental protection and consumer protection (particularly the most vulnerable populations such as women and children), representatives of industry and the appropriate public involvement in the POPs management is essential for a successful implementation of the SC. The National Chemicals Office will have the central role in this process, through the expert body -Inter-ministerial Commission for POPs which will manage information and coordinate mutual interests and activities.

Short- and medium-term measures

1. The definition of the existing situation and further regular monitoring (the presence of POPs in humans and organisms) of the quantities of POPs substances, with the emphasis on PCBs and dioxins in breast milk and human blood and fatty tissues of organisms.

2. The definition of the existing situation and further regular monitoring of the quantities of PCBs and dioxins in the tissues of the human population.

Preliminary measurements of the levels of PCBs and dioxins in the adipose tissue of brown bear were carried out on the initiative of NIP developer, where, based on the previous studies from the neighbouring countries, similar load is expected as in the human body.

3. Monitoring of PCBs and dioxins in the body tissues and breast milk of the population living in the former contamination area of Semič

4. Joining the international movements for evaluation of cross-border transfer of POPs substances and the identification of Slovenian contribution to the pollution over long distances.

5. Activities related to new chemicals with POPs characteristics:

- Examination of new substances with POPs characteristics - basic scientific research of chemical and physical properties, and research on the health effects of the living organisms
- Establishment of a list of new compounds with POPs properties to be included in the SC list and the list of eligible replacements for new compounds
- Preparation of review of the socio-economic consequences of placing new compounds on the convention list and introduction of their substitutes.
- Definition of Slovenia's position in the process of including new substances to the list of SC.
- Updating the educational programme for sellers and end users of new substances included on the SC list.

6. Review the proposals of new compounds to be included in the list of SC.

7. Prepare the list of suitable replacements for the new compounds on the list of SC.

8. Prepare the review of socio-economic impacts of new compounds on the list of SC.

9. Undertake research of the properties and the impacts of new POP candidates for the list of SC.

10. Define the positions in the process of integrating new materials into the SC list.

11. Exchange information through on-line information on the POPs website.

12. In the context of comprehensive regulation of controlling the emissions of unintentionally produced POPs (PCCD/PCDF, PCB, HCB and PAH), taking place during the preparation of the report of the NIP, consider the proposed reporting and information system.

Long-term measures

1. Scientific research links between the exposure to POPs substances and the health state of different populations and age groups.

2. Research on the impact of maternal exposure to POPs substances before and during pregnancy on the healthy development of fetus and child.

3. Toxicological Research – the use of new scientific information and methods (genomics, proteomics) to understand the mechanisms of the toxic activity of POPs substances.

4. Developing appropriate indicators of exposure to certain POPs substances in the environment and use these indicators to monitor the effectiveness of measures for protecting human health from POPs substances in the environment.

3.5 Advantages and proposals for strengthening the capacity

POPs substances do not represent an imminent risk of overdose for the people in Slovenia, although a lot of work has to be done based on the identified required actions. Priority areas for the management of POPs substances in Slovenia are consistent with the priorities of the Stockholm Convention and the EU Regulation on Persistent Organic Pollutants. Slovenia has insufficient knowledge on the health status of the population concerning the exposure to POPs substances. In order to achieve this task, which is also defined in the NIP, appropriate research should be initiated that could demonstrate the potential burden of POPs substances, with an emphasis on the vulnerable population and those who live in Semič, the area once heavily polluted with PCBs.

Strengthened capacity is needed in the management bodies covering this content (MZ, MOP and MAFF), as well as in those administrative and professional bodies whose work is related to education and dissemination of information. Actions should be carried out in line with the Action Plan on information exchange and institutional strengthening.

An integral establishment of monitoring is needed where these have not been put in place, the inventory (location and analysis), and the programme of remediating landfills with POPs substances.

The professional inter-ministerial sub-group for POPs should become the core technical and administrative body for managing the POPs substances in Slovenia. The aim of this group is to coordinate the inter-ministerial action in meeting the requirements of the SC and implementing the envisaged action plans. This expert group should be given the necessary powers, material and human resources for its operation and the implementation of the set goals.

3.6 The schedule for the implementation of action plans

Setting up, realisation and evaluation of action plans are envisaged for the period 2009 − 2013. Task performers will be appointed according to their competence.

Priority areas	Joint measures (short-, medium- and long-term)	Institution
1. Strengthening the institutional and legislative capacity	- Coordination and preparation of legislation - Effectiveness evaluation of the existing rules and measures regulating POPs discharges, and their updating.	MZ, MOP, MAFF
	– Prepare an overview of the situation of POPs content in soil, and measures for the need of organic and integrated agricultural production.	MAFF
	Regulatory measures: - preparation of a regulation related to the emission into air from crematoria and ovens for the incineration of animal carcasses, - Determine the lowest possible quality of fuels for small and medium-combustion plants, - Stricter controls over the ban on waste incineration in private households and outdoors, - Development of the operational programme of hazardous waste management, - Revision of the operational programme for the management of PCBs and PCTs, - Revision of the operational programme for the management of waste oils; - Stricter controls and increased penalties for discharges into sea and inadequately equipped ships, - Establishment of personal responsibilities of marina managers for violating the environmental requirements, and issue of license, - Stricter control over waste incineration operators, manufacture of chemicals, metal production, power plants and cement plants.	MOP
2. Manufacture, transport, use, stockpile and waste of PPP with POPs	Definition and precise location of old burdens of PPP with POPs	MOP
	Check and prepare a plan depending on the results of the inventory of old PPP stocks with POPs substances at sellers and farms for their collection, removal and safe destruction.	URSK
	Organize more frequent periodic collection of hazardous waste at the local level, and provide adequate collection points at all municipal waste landfills.	MOP
	Prepare the assessment of the state of environmental pollution with POPs substances, and recovery plans for each location (D)	MOP
	Remediation of illegal dumps and other irregular deposits of PPP with POPs (D)	MOP, local level

3. Production, import, export, use, identification, labelling, disposal, storage and removal of PCBs and the equipment containing PCBs	Inventory and rehabilitation of non-point sources of PCBs in the MOP operational programme; regulate the control of non-point sources of PCB, collection of waste and illegal dumps.	MOP
	Establishment of the current inventory of equipment with PCBs in use, temporary storage and export for disposal and informing the public thereof.	MOP / ARSO
	Regular maintenance and control of PCB capacitors deposit at the factory Iskra Semič: record the quantity of extinguishing agents containing halogenated compounds in use and sale, and remove them	local level, MOP
	Draft a strategy for ultimate rehabilitation of the PCB capacitors deposit at the factory Iskra Semič (D)	local level, MOP, MZ
4. DDT production, transport, use, stockpile and waste	Covered by point 2	MOP, URSK
5. Generation of unintentionally produced PCDD/ PCDF, HCB and PCB	Inventory of emissions and introduce control over unintentionally produced PCCD/PCDF, PCB and HCB in Slovenia on certain sources: the existing incineration plants, cement plants upon co-combustion of hazardous waste, thermal processes in the metallurgical industry, pulp production plants in technical processes of bleaching pulp with chlorine	MOP
	Establish control of POPs in solid waste sludge from biological treatment plants	MOP
	Establish a mechanism for identification and inventory of new sources and POPs releases into the environment, including the keeping of regular annual records	MOP
	Identification of sources of discharges: - in the existing incinerators, - in cement plants at co-burning of hazardous wastes, - in thermal processes of metallurgical industry, - In pulp production plants at technical processes of bleaching pulp with chlorine, - Analysis of sewage sludge and assessment of POPs emissions from sewage sludge, - Identification of POPs releases from combustion appliances in households, - Determination of POPs emissions from burning waste in the open air, - Determination of annual POPs emissions due to natural and other disasters, - Drawing up questionnaires for preparing the inventory of unintentionally produced POPs, - Implementation of a survey on unintentionally produced POPs, - Perform re-calculation and use new tools for data computed in 2005.	MOP/ARSO, URSK

	Reducing emissions of unintentionally produced POPs: - Preparation of incentives to improve internal monitoring of POPs, - Improve internal monitoring of POPs pollutants in the production of pulp and paper, - Improve internal monitoring of POPs pollutants in the metallurgical industry, - Improve internal monitoring of POPs pollutants in the chemical industry - Improve internal monitoring of POPs pollutants in waste incineration and co-incineration of waste - Improve internal monitoring of POPs pollutants in the combustion of biofuels.	MOP / ARSO
	Improving knowledge and information on emissions, dispersion sources and exposure, and possible paths of unintentionally produced POPs: - analyse unintentionally released POPs at thermal processes in large and small devices, - Identify other sources of POPs and take the necessary actions.	MOP
	Introduce changes and strategies in technological processes for reducing POPs emissions in all environmental elements, waste and products. (D)	MOP, MG
6. Identification of the stocks of products in use and waste: DDT, HCB (Annex A, B, C, chemicals) - The plan for evaluation and prevention of releases from stockpiles and wastes	A need to establish or update the appropriate database on the state of environmental burden by PPP with POPs substances.	MOP, MAFF, MZ / URSK
	If necessary, conduct a review of pollution of watercourses and groundwater near the former and still operating deposits of communal and hazardous waste and those in the vicinity of intensive agricultural areas.	MOP
	Prepare a standard procedure for action, including the terms of reference and methods of financing.	MOP
	Remediation and action to prevent further release of PPP with POPs from waste. (D)	MOP
7. Identification of contaminated sites, and proper handling	Prepare the review of the most important old burdens of PPP with POPs	URSK, MAFF
	Establishment or continued monitoring of the residues of PPP with POPs substances in soil	MAFF
	Keep regular monitoring of residues of POPs PPP substances in food and agricultural products	MZ, MAFF
	Long-term environmental monitoring in the municipality Semič with measurements of PCBs and dioxins / furans (D)	MZ, MOP
	Include instructions for conduct in cases of the presence of PPP residues with POPs substances into standard procedures of action	MAFF, MOP
	Perform a comprehensive review of sites contaminated by POPs and make a preliminary assessment of risks for human health and the environment (D)	MZ, MOP, MAFF

8. data exchange strategy	Establishing a central information centre for POPs and data on POPs	URSK, MOP, MAFF
	Establishing a professional inter-ministerial POPs Commission	URSK
	Creating a national web portal for POPs and a comprehensive presentation of data and information on the SC on POPs, the state of the environment in Slovenia and abroad, the sources of emissions, the impacts and effects, the possibilities for action and efficiency of these measures	URSK, MOP
9. Public awareness, information and training	- Preparing folders and brochures, - Creating a web site on POPs substances - Organising educational meetings with journalists on POPs, preparing a training course for selected target groups, information and creation of a national web portal for POPs, preparation of communication strategies for public relations, develop a mechanism to submit proposals for extending the list of POPs, problem workshops, support the activities of the IPPC centre - Exchange of information	URSK, MOP, MAFF
10. Monitoring	If necessary, complement the ongoing regular monitoring with the requirements of SC and international programmes, establish a long-term concept	MOP, MAFF, MZ
	Establish biomonitoring POPs substances in humans and biota	URSK, MZ
	Establish biomonitoring POPs substances in marinas	MOP
	Carry out regular monitoring of POPs (D) in all segments of the environment, waste, food	MOP, MAFF, URSK, MZ
	Determine the contamination of air as a possible source of indirect contamination with statistical processing and expert analysis of the collected data and their publication on the website.	MOP / ARSO
	Inventory of illegal deposits of the former military barracks and additional monitoring of air in the course of military exercises	MO, MOP
11. Monitoring and studying the effects of POPs on human health in the RS	**Epidemiological research and data:** - Obtain information on the population burden by POPs - Assessment of the impact on the employees' health in enterprises which still use or store the equipment containing PCB, - Long-term effects of PCB on human health, - Tracking the dynamics of the load (the evaluation of the effectiveness of protection of the population) and publicity (recommendations); determination on the content of D/F in toxic equivalents per gram of fat for the Slovenian population, determine the value of daily dietary intake of D/F in Slovenia - Tracking the health of the population	MZ, URSK
12. Reporting	In line with the Stockholm Convention, Regulation 850/04/ES and Protocol to the CLRTAP	URSK, MOP/ARSO
	Preparation of proposals for the improvement of the existing reporting system	URSK, MOP/ARSO
13. Strategy for research and development	Definition of the existing status and further regular monitoring the presence of POPs in humans and organisms, quantities of POPs substances with the emphasis on PCB and dioxins in breast milk and human blood and fatty tissues of organisms	URSK, MZ

	Establishment of the current situation and further regular monitoring the value of products and PCB dioxins in tissues of the human population	URSK, MZ
	Monitoring of PCB and dioxins in body tissues and breast milk of the population living in the formerly polluted territory of Semič	URSK, MZ
	Integration in international movements for evaluating transboundary movements of POP substances	MOP, MKGP
	Activities connected with new compounds with POPs properties	MOP, MKGP, MZ/URSK
	Drawing up a list of POPs alternatives	URSK, MOP, MKGP
	Scientific research of the POPs effects on the health of living beings and the integration in international activities and projects in the field of POPs impacts on human health, participation in international research work.	URSK, MOP, MKGP

3.7 Key investments

The costs for enforcing the requirements under the National Implementation Plan for the management of persistent organic pollutants are covered by the responsible ministries (MZ, MOP and MAFF), which have a mandate in the field of persistent organic pollutants, together with other ministries (MoD) for the implementation of the measures and tasks envisaged in the proposed action plans.

In line with the rules for financing the environmental programmes, the key financial instruments include LIFE + and the Cohesion Fund, and the European Regional Development Fund.
While LIFE + allows the implementation of individual directives and strengthening of institutional capacities of Member States, the Cohesion Fund and the Slovenian Operational Programme for environment and transport infrastructure enable the remediation of areas contaminated with PCBs and pesticides. In line with the Slovenian Operational Programme for developing regional potential, funds can be obtained from the European Regional Development Fund for research and development projects. The European Social Fund enables the preparation of new educational programmes in line with the Slovenian Operational Programme for the development of human resources.