***Minitry of the Environment of the Slovak Republic***

# *IMPLEMENTATION PLAN UNDER THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS (POPS) IN SLOVAKIA*

*Implementation Plan for the Stockholm Convention of the Slovak Republic was published by the Ministry of the Environment of the Slovak Republic and has been approved by the Government Decision No. 415 on 10 May 2006.*

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# Executive Summary

## Introduction

Problems associated with persistent organic pollutants (POPs) have to be solved on international level. This is due to their characteristic properties such as *low degradability, bio-accumulation, toxicity, semi-volatility and potential to long-range transport.* Two international conventions are presently adopted having the goal to protect human health and environment against the adverse effects of POPs: The POPs Protocol to the UN ECE Convention on Long-range Trans-boundary Air Pollution (1998) and the UN Stockholm Convention on POPs (2001). Slovakia is party to both international commitments.

The European Union is party to these conventions as well and in addition adopted also the Community Policy for POPs Management, which will upon joining the EU become mandatory also to Slovakia.

## Goal

Based on the present situation analysis, considering the provisions of relevant international commitments it is necessary to identify POPs priority problems in the SR and to elaborate the *National Implementation Plan* for their gradual solving within the requested period.

## Method

The Ministry of Environment of the SR (ME SR) in co-operation with other stakeholders was responsible for project execution. Experts from relevant fields were involved in the project execution in order to utilise the best available information and approaches in SR, considering at the same time documents and guidance recently published by relevant international organisations (UNEP, UN ECE and EU).

## National Implementation Plan

Project GEF SLO/01/G31 "*Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)*" served as a basis for NIP elaboration. The project was aimed at preparation of a proposal for sustainable capacities in SR as well as a background for Stockholm Convention obligations. The individual partial tasks were performed with an assistance of more than 30 experts from environmental sector, but also health protection, agriculture and private sectors.

NIP structure is based on the recommended structure issued by European Commission as document No. ENV/C.3/D(2005) dated January 1, 2005.

NIP contains the evaluation of individual POPs issues in SR with emphasis to the requirements of the international obligations. According to them, detailed activities were proposed for the individual sectors. The time and financial implementation plan was proposed in the framework of the above project. Following problem areas are subject to the NIP:

**POPs pesticides**

*Baseline definition:*

POPs pesticides (active substances) were never directly produced in Slovakia. Their use is currently prohibited. Obsolete stockpiles (inventory, storage and destruction) remain a problem. Central Agricultural Inspecting and Testing Institute (CAITI) performed an inventory of obsolete POPs pesticide stockpiles in the years 2000 and 2003 and documented more than 28 tons of stored POPs pesticide preparations.

*Identification of problems:*

- investigation of stockpiles in order to ensure their immediate safe storage before their disposal,
- preparation and ensurance of disposal of chlorinated POPs pesticides by an environmentally sound mean,
- performance of activities that will facilitate to identify the exposure routes of inhabitants and environmental sectors,
- elaboration and performance of measures in order to reduce the burden to inhabitants by POPs pesticides.

Potentially difficult sectors in SR are as follows:

- Co-operation of plant inspectors with the Slovak Environmental Inspectorate,
- Safe storage,
- Definition of environmentally sound destruction manner,
- State support for the ultimate destruction of POPs pesticides,
- Measures to reduce exposure of inhabitants.

| *Activity:* | | *Timeframe* |
|---|---|---|
| **1.** | To improve the existing mechanism of stockpile records of obsolete POPs plant protection preparations in order to facilitate the information flow to NCP-POPs | 2006 |
| **2.** | To implement an effective information system on the usage of chemical preparations and products containing HCB (except plant protection preparations) | 2006 |
| **3.** | To secure environmentally sound destruction of POPs pesticides in Slovakia, with respect to BAT/BEP | ongoing |
| **4.** | To set up and implement a public awareness raising information campaign; in particular adequate training of those, performing inventory of obsolete pesticide stockpiles and wastes in the agricultural sector | ongoing |

**Assessment and control of chemical substances use**

*Baseline definition:*

After the SR joined the EU, the SR participates in the PBT working group on the ongoing assessment of the active ingredient trifluralin of plant protection preparations according to the Commission Regulation 451/2000/ES.

SR also participates on the assessment of new chemical substances. Whenever it will be appropriate regarding the EC activities, the SR would need to ensure an active participation of expert capacities also on the evaluation of industrial chemicals.

*Identification of problems:*

- set-up of measures for control of new pesticides or new industrial chemicals production,
- implementation of an effective mechanism for providing information on the production and use of new industrial chemicals and gradual phase-out of POPs and similar substances with POPs properties production in the SR,
- format definition for providing information on the production and use of new industrial chemicals in the SR (National Contact Point for POPs – NCP-POPs).

*Activity:*

| | | *Timeframe* |
|---|---|---|
| 1. | Personnel strengthening of respective body for assessment of new chemicals with POPs characteristics according to the requirements of Stockholm Convention | ongoing |
| 2. | Ensure an effective control system for industrial chemicals with POPs characteristics | ongoing |

**Equipment and wastes containing PCBs**

*Baseline definition:*

Altogether, 21 500 tons of PCBs were produced in Slovakia during the period 1959-1984, and broadly utilised in former Czechoslovakia mainly for production of capacitors, paints and varnishes.

Based on extensive inventories, which were carried out in the years 2000 and 2002, current existence of about 3500 tons of PCBs (1000 tons of production wastes, 1000 tons in closed systems and 1500 tons of various PCBs containing wastes) may be assumed in the territory of Slovakia. Further 900 tons of PCBs containing wastes are probably stored at the Pláne landfill. Nearly 31 000 pcs of contaminated equipment has been identified during the primary inventory.
The implementation of the EU regulatory framework in the SR during 2004, a legal environment was set for ensurance of proper control of handling with the contaminated equipment, PCB stockpiles and wastes from the abandoned production. Based on this background an ongoing inventory starts in 2004, that is supported by the national legislation. As of June 31, 2005, resulting 38 100 pcs of contaminated equipment in operation were recorded.

Some differences in the number of recorded contaminated equipment when compared with the results from the year 2001 may appear as a result of sequential disposal of the recorded equipment and their following rejection from the database. It is necessary to emphasise that the inventory is still ongoing and the total number of recorded contaminated equipment will probably increase.

*Identification of problems:*

- PCB stockpiles and wastes,
- Usage and phase out of contaminated equipment,
- Safe and environmentally sound destruction of PCB and PCB waste,
- Environmental matrices contamination and population health risk in the Zemplin territory.

Potentially difficult sectors in the SR are as follows:

- Inventory of equipment containing PCBs
- Safe storage and handling
- Definition of environmentally sound destruction manner
- Timeframe for phase out and destruction of PCBs and PCBs containing equipment
- Decontamination of polluted areas
- Measures to reduce exposure of inhabitants

*Activity:*

| | | *Timeframe* |
|---|---|---|
| **1.** | To assure continuous inventory of PCBs containing equipment | Ongoing |
| **2.** | To secure environmentally sound destruction of PCBs in Slovakia, with respect to BAT/BEP | 31.12. 2010 |
| **3.** | To assure and carry out decontamination of polluted areas | December 2015 |
| **4.** | To assure elaboration and implementation of technical standards concerning analysis, transportation, storage, exchange, decontamination and destruction of PCBs | Ongoing |
| **5.** | To apply measures for reduced PCB penetration into the food chain and effectively reduce the population exposure | December 2010 |
| **6.** | To set up and implement a public awareness raising campaign; in particular adequate training of public as well as private sectors | |

**Unintentionally produced POPs**

*Baseline definition:*

The releases of unintentionally produced POPs in Slovakia had in the period 1990-2001 decreasing trends. The PCDD/PCDF emissions decreased by 23 %, the PAHs by 35 %; HCB by 25 %; and PCBs by 15 %. Gradual implementing of environmental measures in the main polluting sectors (metallurgy, waste incineration, energy sector and transportation) triggered by the introduction and implementation of the new BAT/BEP based environment protection legislation, were the main reasons for this decrease.

*Identification of problems:*

- Consistent enforcement of the environmental legislation,
- BAT & BEP definition,
- Uncontrolled combustion,
- Chlorinated and halogenated chemical production,
- Waste incineration,
- Handling of wastes containing or potentially releasing POPs,

- Pulp and paper technologies utilising chlorine and derivatives of chlorine as bleaching agent,
- Secondary non-ferrous metals production.

*Activity:*

| | | *Timeframe* |
|---|---|---|
| **1.** | To enforce consistently the requirement of operating certain activities in compliance with BAT & BEP for new sources and gradual implementation of BAT & BEP in existing sources. | Ongoing |
| **2.** | To set up a framework for monitoring and mitigation of total releases of chlorine or other halogens containing pollution | Ongoing |
| **3.** | To reach compliance in the pulp bleaching technology, based on molecular chlorine, with IPPC BAT requirements within the period of ten years | 2010 |
| **4.** | To eliminate uncontrolled thermal destruction of organic coatings from recycled raw materials for secondary metal production; to promote non-thermal mechanic de-coating methods | Ongoing |
| **5.** | To modify current reporting methods and means concerning waste production, air emissions, wastewater production as well as consumption and use of hazardous substances, in order to optimise their monitoring | 2007 |
| **6.** | To develop and implement an education, training and course system, dedicated to employees working at various levels of the relevant sectors. | Ongoing |
| **7.** | To develop a project to assess the amount of unintentionally produced POPs, generated by waste wood incineration, and to apprise the seriousness of this problem in Slovakia | 2008 |
| **8.** | To promote non-oxidative processes and BAT for destruction of wastes containing POPs and for destruction of wastes containing chlorine | 2007 |
| **9.** | To promote BAT & BEP related research | Ongoing |

**Contaminated sites and releases from stockpiles and wastes**

*Baseline definition:*

Major problem is the pollution of open wastewater channel in Strážske locality and resulting pollution of the Laborec River and the Zemplínska Šírava water reservoir, as a consequence of previous PCBs production (see PCBs).

Second important group of contaminated areas, polluted with PCBs, is the vicinity of asphalt mixing plants caused by improper handling with PCBs containing heat-exchange fluids. The rest of the identified localities may be classified as non-specific, caused mostly by accidents or improper handling with POPs.

*Identification of problems:*

- Ecological survey of contaminated areas as identified by the inventory,
- Contaminated sites remediation strategy,
- Execution of the remediation activities
- Creation of a steering and co-ordination centre

*Activity:*

| | | *Timeframe* |
|---|---|---|
| **1.** | To assure environmental assessment in PCBs contaminated areas of Strážske area and the former asphalt mixing plants | Ongoing |
| **2.** | To develop a remediation strategy for the contaminated areas | 2007 |
| **3.** | To execute the remediation activities | Ongoing |
| **4.** | To establish a steering body and its statute for management, coordination and control of investigative and remediation activities, as well as the liaison with the cooperating institutions and organs. | Ongoing |

**Monitoring**

*Baseline definition:*

POPs, in particular PCBs, DDT and HCB, are monitored in an uncoordinated manner in all components of environment, living organisms (including humans) and food chain. None of the monitoring programs covers the whole area of Slovakia. Highest POPs levels were detected in human population and domestic animals. Regarding the components of environment, highest POPs concentration levels were detected in soils and locally (Strážske region) in sediments. In general, decreasing tendency of POPs presence prevails in all monitored matrices.

*Identification of problems:*

- Focusing of the POPs monitoring on their potential sources,
- Co-ordination and consistent methodical guidance of POPs measurements in the particular monitoring programs,
- Co-ordination of reporting of the monitoring results,
- Insufficient data on PCDD/PCDF presence in all monitored matrices,
- Lacking data on POPs concentration in ambient air.

*Activity:*

| | | *Timeframe* |
|---|---|---|
| **1.** | To establish a working group on POPs monitoring | September 2006 |
| **2.** | To elaborate a strategy for consistent POPs monitoring program in Slovakia | June 2007 |
| **3.** | To assure operation and coordination of POPs monitoring according to the elaborated national monitoring program | December 2007 |
| **4.** | To verify the analytical methods and ensure coordination of laboratories so as to utilize sufficiently accurate and selective analytical methods | December 2007 |
| **5.** | To assure data flow between the institutions responsible for monitoring and the institution/institutions responsible for reporting | September 2007 |
| **6.** | To make the monitoring results accessible to broad public in sufficiently comprehensible form | Ongoing |
| **7.** | To promote research in the fields linked to the proposal and operation of monitoring on national and international level | Ongoing |

**Reporting and information exchange, involvement of stakeholders**

*Baseline definition:*

The reporting and information exchange obligations are for Slovakia directly implicit from the international commitments regarding POPs (the POPs Protocol, the Stockholm Convention, the Basel Convention) as well as from certain EU requirements (EC, EEA, EUROSTAT). Basically, all actual requirements are met; however, neither the coordination of the reporting nor its unified institutional background does exist.

*Identification of problems:*

- Establishment of a National Contact Point (NCP-POPs) in order to assure meeting of requirements, pursuant to articles 9 and 15 of the Stockholm Convention, in the framework of an already existing organisation or institution, keeping records about some of the POPs,
- Establishment of data-flow mechanisms to pass the partial information on POPs from the competent national institutions to the NCP-POPs,
- Acquisition of complete and relevant data on production, import, export and use of POPs from the competent national institutions and in formats suitable for reporting to the Stockholm Convention Secretariat,

*Activity:*

| | | *Timeframe* |
|---|---|---|
| **1.** | To designate a National Contact Point (NCP-POPs) | December 2006 |
| **2.** | To introduce an effective system of reporting by responsible institutions towards the NCP-POPs | December 2006 |
| **3.** | To introduce an effective system of information exchange on the actual import / export of POPs between the stakeholders and NCP-POPs | According to the relevant EU legislation |
| **4.** | To introduce an effective system of information exchange on the expired POPs pesticides handling | September 2006 |
| **5.** | To introduce an effective information exchange system on appearance and handling with dangerous wastes containing POPs, their import / export towards NCP-POPs | January 2007 |
| **6.** | To introduce an effective information system on contaminated equipment and its phase out in SR toward NCP-POPs | September 2006 |
| **7.** | To introduce an effective surveillance system of chemicals production, and phase out of POPs or similar substances production in SR and reporting to NCP-POPS | September 2006 |
| **8.** | To introduce effective system of information flow on the use of chemical preparations and products where the HCB content is banned (besides plant protection preparations) | September 2006 |

**Raising of public awareness on POPs**

*Baseline definition:*

There is neither an integrated public information system on POP nor a public participation scheme on decision-making process regarding POPs currently in place in Slovakia.
There is no systematic education of experts; the public gets information about issues concerning POPs or other hazardous chemicals only at random (e.g. by publishing reports

from relevant research or individual studies carried out in the framework of various programs). It is assumed that the UN ECE Aarhus Convention and the EP and EC Directive 2003/4/ES about Public Access to Environmental Information will provide the framework for public participation on decision-making process in the field of environmental protection in the Slovak Republic. Slovakia is currently in the process of respective accession/transposition.

*Identification of problems:*

- General absence of systematic approach to information dissemination and public participation on decision-making process; insufficient cooperation among the responsible sectors, government departments, competent bodies and institutions
- Lacking public awareness of pollution levels in the particular components of environment and food in the contaminated Zemplín district
- Need to raise awareness among plant inspectors and customs officers on the possibility of imports of non-permitted plant protection preparations containing POPs
- Insufficient knowledge in the industrial sectors about hazardous properties of POPs containing equipment and about the way of handling with them, including their sound destruction
- Low public awareness concerning unsuitability of certain wastes burning in household stoves
- Need to include the issues of POPs (and other hazardous chemicals) in appropriate manner into the curricula at all levels of the educational-process structure

*Activity:*

| | | *Timeframe* |
|---|---|---|
| **1.** | To provide sufficient information with regard to risk exposure in the contaminated area of Zemplín in order to help people decide on their "behaviour pattern" | 2007 |
| **2.** | To minimise the professional exposure risks and increase the awareness on the needs of destruction in compliance with prepared legislative measures | 2007 |
| **3.** | To minimise the household combustion as POPs resource | Ongoing |
| **4.** | To supplement continuously the education content for students of basic and secondary schools as well as students of pedagogical departments who will enter the educational process | 2007 |
| **5.** | To incorporate information on POPs into the existing information systems; when they are not in full operation – to propose a separate system on dangerous chemical substances | Ongoing |

**Institutional and legal measures**

*Baseline definition:*

Legal regulations concerning POPs are intersecting through several government departments (healthcare, environment, agriculture and finance-customs).

Main driving force influencing the forming of new legislation is, besides requests of the international treaties, also necessity to harmonise the Slovak legislation with that of EU, in particular with the Regulation (EC) No. 850/2004 on POPs.

*Identification of problems:*

- Management and control of pesticides
- Management and control of PCBs
- Assessment of new pesticides and chemicals
- Reduction and elimination of unintentional POPs production
- Control of handling with hazardous wastes containing POPs

**Research and development**

*Baseline definition*

State R&D programs according to state order are providing the most important platform for research and development concerning POPs issues (proposals as suggested in the particular POPs NIP action plans). State programs are development programs, which should contribute to socio-economic development of Slovakia. They should become the most preferred research tasks in the future, onto which also the financial support should focus.

However, general structural problems, caused by a long-term lack of state as well as private financial sources (according to EU their ratio should be 1/3 to 2/3) supporting R&D in Slovakia, are performing potential risks also for implementation of POPs specific project tasks. Besides insufficient financing, also pertaining problems with current legislation, which is not consistent enough with the program financing method pursuant to Act on Science and Engineering as well as with the Act on Support Agency for Science and Engineering, are enhancing the risks.

*Identification of problems*:

- Utilisation of the existing system of R&D financing through Support Agency for Science and Engineering (inclusion of POPs into the priority list of the state program of research and development),
- Participation of Slovakia in the 6-th EU Framework Program for Science and Engineering or other international cooperation.

**Timetable and resource requirements for NIP implementation**

The partial timetables are proposed directly in the framework of the individual chapters of National Implementation Plan for the Stockholm Convention and their finalisation will be secured as a part of the proposal for allocations to this plan for the period till year 2025 that will be elaborated in the separate document delivered to the Government of the SR session. The specification of gradual measures will be based on the priority issues that require some solution.

A proper capacity strengthening of institutions unavoidably involved in the issues like compatibility assurance of relevant legal instruments linked to EEC UN and international conventions in compliance with EU legislation seems of high importance, as well as international cooperation for implementation of harmonised procedures and institutional mechanisms for evaluation of enforcement and non-compliance and joining of global initiatives towards implementation of harmonised monitoring and reporting in the POPs issues and elaboration of harmonised methodology for NIP updates in the future.

## Conclusions

NIP proposal was elaborated in broad co-operation of all stakeholders on the base of detailed analysis of present situation in Slovakia bearing in mind relevant international commitments, documents and guidance. Due to their multi-sectoral character, priority setting of the POPs issues was done step-by-step on horizontal (identification of general priorities) as well as on vertical levels. On vertical levels priority problems as well as the strategies/action plans to solve them were identified within the individual problem areas.

Finally, combined horizontal and vertical national priority setting took place. On its base following priorities at national level were pointed out:

## Priorities

It resulted from the particular activities as well as complex evaluation of the problem that the priorities for Slovakia in the Stockholm Convention implementation in order to protect the population health and the environment against POPs are as follows:

1. Relevant capacity strengthening of institutions that are necessarily involved in the activities required by EEC, UN and international conventions in compliance with EU legislation in the following issues:
    a) compatibility assurance of relevant legislative acts,
    b) implementation of harmonised procedures and institutional mechanisms for evaluation of enforcement and non-compliance of convention,
    c) implementation of harmonised monitoring and reporting,
    d) support to stepwise implementation of best techniques and environmental procedures in order to assure decline of releases of unintentionally produced POPs,
    e) co-ordination of technical development and research in the field of alternative chemicals,
    f) assurance of assessment of new chemicals from their persistence point of view,
    g) implementation of harmonised procedures and methods of amendment of POPs lists in the Convention annexes,
    h) elaboration of harmonised methodology for updating of National Implementation Plans,
    i) environmentally sound handling with POPs waste – waste comprising POPs, containing POPs or waste contaminated by POPs in co-operation with experts issuing the guidelines for environmentally sound management of those wastes in the framework of Basel Convention agenda,
    j) co-operation with experts involved in Rotterdam Convention agenda.

2. Destruction of PCBs and PCB waste by environmentally sound manner,

3. Destruction of obsolete POPs pesticides stockpiles appearing on the territory of the SR as so called „historical waste“ resulting from communistic agricultural management in the past,

4. Decontamination of sediments of water recipients and surrounding soil resulting from abandoned production in Chemko Strážske,

5. Investigation of areas contaminated by POPs and their decontamination,

6. Environmental awareness raising campaign for public,

7. Research and development in the field of POPs management.

# 1. Introduction

In May 2001, the *UN Stockholm Convention on Persistent Organic Pollutants* (later on referred to as the Stockholm Convention) was adopted. Signatories to this convention are obliged to adopt measures to eliminate sources of releases of the twelve chemicals belonging to the group of persistent organic compounds (aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorbenzene, mirex, toxaphene, PCBs, DDT, PCDD, and PCDF). Persistent organic pollutants are nondegradable organic substances entitled as POPs.

Stockholm Convention entered into force also for Slovakia on May 17 2004 and it was published in section 254/2004 Coll. SR in the framework of announcement of Ministry for Foreign Affairs SR No. 593 in both, Slovak and English language.

Obligations resulting from Stockholm Convention for Slovakia are as follows:

1. Ban of production and use of listed POPs (Art. 3.1.a, namely aldrine, chlordane, dieldrine, endrine, heptachlor, hexachlorbenzene, mirex, toxaphene and PCBs),
2. Restricted production and use of DDT (Art. 3.1.b),
3. Ban or restriction of import and export of these substances (Art. 3.1. and Art. 3.2.),
4. Measures for reduction of total amount of PCDD/F and HCB and PCB released from anthropogenic resources listed in Annex C in order to permanent minimisation and, if possible, their complete elimination (namely following equipment and activities: waste incineration including common incineration of municipal, dangerous and hospital waste or sludge, cement kilns incinerating dangerous waste, pulp production with elementary chlorine or substances releasing elementary chlorine used as a bleaching agent, thermal processes in metallurgy as secondary copper production, sintering plant in ferrous and steel industry, secondary aluminium and zinc production, opened incineration of waste including landfill burning, thermal procedures in metallurgy not listed in part II, household burning, power plants incinerating fossil fuels and industrial boilers, equipment for wood and other biomass incineration, special chemical production processes releasing unintentionally appearing POPs, mainly chlorophenol and chloranil production, crematories, motor vehicles, mainly those burning leaded fuel, incineration of biological waste, staining and processing of fur and textiles (by chloranil) and finishing (alkaline extraction), facilities for end-of-life vehicles and burning of copper wires, refineries of waste oils.
5. Assurance of environmentally sound handling with POPs waste, i.e. waste comprising POPs, containing POPs or waste contaminated POPs.

Status of compliance with Stockholm Convention obligations is as follows:

**Ad 1.** Status investigation in this field was performed in the framework of GEF project entitled *„ Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs) "*. The initial investigations shown that POPs in question are not produced nor used in Slovakia at present (aldrine, chlordane, dieldrine, endrine, heptachlor, hexachlorobenzene, mirex, toxaphene)

In relation to PCB the following is to be noticed:

In the former state enterprise Chemko n.p., (city Strážske, district Michalovce, eastern Slovakia) PCB were produced in the period of years 1959 to 1984, when the production was abandoned.

Activities compliant with the Council Directive 96/59/EC on disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) are performed at present. According to the article 4 (1) of this directive the member states are obliged to perform an inventory of equipment containing PCBs in amount exceeding 5 $dm^3$ and consequently to send a summary information on this activity to European Commission.

The activities in this field are ensured on the national level pursuant to the Act No. 24/2004 Coll., amending Act No. 223/2001 Coll. on waste as described in the later guidance, effective since March 1 2004. This act implements the corresponding directive and Slovak Environmental Agency, Centre of Waste and Environmental Management Bratislava (SEA CWEM BA) is responsible for recording and updating the list of equipment containing PCB on behalf of Ministry of Environment the SR. The Agency handles particular data that were reported via Permanent Mission of the SR to the EU to European Commission on September 5 2005.

SR endeavours to keep the time frame for collection and following destruction of contaminated equipment till the deadline – year 2010 and 2025 (for equipment not listed in the respective EU directive), as required by article 3 of this directive following the paragraph a) II. of the annex A of Stockholm Convention as well as article 3 of this convention.

Selection of the particular technology for PCB destruction will be performed under the GEF/UNIDO project entitled „Removal of Barriers that Impede Adoption and Effective Implementation of Available Non-combustion Technologies for POPs Destruction and Demonstration of Viability of these Methods".

**Ad 2.** Reduction of production and use of DDT according to article 3.1.b of the convention is not applicable as DDT is not produced nor used in Slovakia.

**Ad 3.** Ban or reduction of import and export of these substances according to article 3.1. and 3.2. of the convention are solved in relation to the Rotterdam Convention agenda on the prior consent information on selected dangerous substances and pesticides in the frame of international trade according to the Regulation (EC) No. 304/2003 of European Parliament and Council on export and import of dangerous substances.

**Ad 4.** Measures for reduction of the total amounts of PCDD/F and HCB and PCB released from anthropogenic sources, as listed in annex C of the convention are proposed in the Action plan for identification, characterisation and solution of release of the POPs in question.

**Ad 5.** Environmentally sound handling with POPs wastes, i.e. waste comprising of POPs, containing POPs or waste contaminated by POPs is assured in compliance with relevant legal documents of European Union, namely: Regulation (EC) No. 850/2004 on POPs and on change of Directive 79/117/EEC (hereinafter referred to as Regulation (EC) No. 850/2004 on POPs), Council Regulation (EEC) No. 259/93 on control and management of waste transport in, via and into the European Community, Council Directive 96/59/EC on disposal of PCB/PCT, Framework Council Directive 75/442/EC on waste, Council Directive 91/689/EEC on dangerous waste, Council Directive 75/439/ES on destruction of waste oils, EP and Council Directive 2002/96/ES on electronic scrap as worded actually, Directive 2000/53/EC on end-of-life vehicles and 2000/76/EC on waste incineration.

In the relevant cases also polyaromatic hydrocarbons (PAHs) will be touched in addition to the mentioned substances according to the requirements of Regulation (EC) No. 850/2004 on POPs.

The measures according to the Stockholm Convention should comprise limitation of direct POPs production, gradual phase out of POPs containing equipment, elimination of unintentional POPs emission released in the defined industrial sectors, as well as increased information of state administration organs and broader public.

In order to follow these targets the Stockholm Convention parties are obliged to elaborate National Implementation Plan (NIP) and to deliver it to the Stockholm Convention secretariat until two years since it entered into force.

NIP is aimed at creation of legislative basis, capacity background and technical infrastructure that will allow reaching favourable development in the POPs issues thank to effective monitoring and evaluation. It will serve for preparation of inputs for decision making process as well as development of investment strategies including selection of priority projects in the framework of long-term improvement of POPs issues; reduction of negative impacts to the environment on regional level and on the level of sources in the framework of new financial perspective of EU for years 2007 – 2013 will also be gained.

NIP structure is based on the recommended structure by the European Commission – document No. ENV/C.3/D (2005) dated 30 January 2005.

Project GEF SLO/01/G31 "*Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)* " served as a basis for NIP elaboration. This project was aimed at preparation of proposal for development of sustainable capacities in SR, and a basis for the Stockholm Convention obligations fulfilment Draft NIP resulted from the project. More than 30 experts from environmental, health, agricultural and private sectors participated on elaboration of the particular tasks.

***Project activities comprised:***

Project inception phase

Setting of the project co-ordination mechanisms and building of capacities for its implementation were the main outputs of the project inception phase. Stakeholder analysis and a series of workshops, aimed at providing information about the project intentions to various interest groups, preceded these steps. During project inception phase the document "*Project Implementation Handbook*" was elaborated describing the division of responsibilities and competence as well as work-plans for the particular task teams. An independent expatriate expert undertook review of this document.

Analytical project phase

First, information on POPs management system in Slovakia as well as on POPs occurrence in components of the environment and living organisms, including humans, was collected. The results were published in the following technical reports:

- Technical report No 1: *Evaluation of the National Legal Framework and Institutional Background with Regard to POPs in the Slovak Republic.*

- Technical report No 2: *Initial POPs Inventory in the Slovak Republic*.

Consequently, problem areas connected with the Stockholm Convention implementation were identified. As output of these activities the Technical report No 3: *Setting of Priorities and Objectives in the Field of Persistent Organic Pollutants in the Slovak Republic* was published, defining the scope of work for NIP elaboration.
During the analytical project phase, the following additional activities were carried out in order to supplement the missing data and information:

- Supplementary as well as initial monitoring of POPs pesticides in sediments,
- Supplementary as well as initial monitoring of PCDD/PCDF and PCBs in sediments,
- Supplementary as well as initial monitoring of PCDD/PCDF and PCBs in stack emissions,
- Supplementary activities concerning public relations.

NIP development phase

The NIP was elaborated and formulated bearing in mind the following:

- The NIP is describing how Slovakia will meet requirements of the Stockholm Convention.
- The NIP is consisting of action plans and strategies, cross-linked into a logical entity, avoiding at the same time possible duplicity of work, while implementing the particular action plans and strategies.
- The NIP shall be embedded into existing context of the national environmental protection strategy and considers activities with regard to fulfilling of other related international commitments.

According to the EU membership of the SR since 1 May 2004, in order to early and harmonized implementation of obligations resulting from Stockholm Convention there is a development which is compliant with European Commission activities corresponding to Regulation (EC) No. 850/2004 on POPs. Besides of Stockholm Convention also Protocol on POPs of Convention on Long-range transboundary air pollution. Announcement of Ministry for Foreign Affairs SR (No. 367, section 158/203 Coll.) was published on this protocol effective since 23 October 2003, also for SR. Text of this protocol is available on the web page of Ministry of Environment SR (www.enviro.gov.sk) in the section of international agreements and conventions in the air protection field.
This regulation contains principles and obligations resulting form the both above mentioned international documents in order to ensure high level of human population health as well as environmental protection. Moreover, it sets out certain obligations additional to the mentioned documents, or it justifies them or defines them more strictly.

Based on the current guidance of the European Commission, a working group was established by Ministry of Environment SR comprising experts from corresponding fields. The group is focused on upgrading of existing draft NIP. Co-ordination activities were secured that resulted in NIP respecting actual state-of-the-art in POPs issues in Slovakia in year 2005.

# 2. Baseline Definition

## *2.1 National Profile*

### Geography and Settlement

***Geographical characterisation of Slovak territory***
The Slovak Republic is an inland Central European state with area 49 034 $km^2$. It belongs among the small European states (27th place according to the geographical surface). The neighbouring states are the Czech Republic, Austria, Hungary, Ukraine and Poland. Except of Ukraine all the neighbours belong to the EU since 1 May 2004.
Area of the Slovak Republic is about 49 000. $km^2$; it borders with five states – Hungary (the longest border), Austria, Czech Republic, Poland and Ukraine, and constitutes the geographical centre of Europe.

From geomorphology point of view Slovakia extends into four provinces – Eastern and Western Panonian Basin, Eastern and Western Karpathians with highest peak of Slovakia, the Gerlach pinnacle (2 654 m ) and with glacial relief of the High Tatra Mountains. Mountainous surface prevails, 56% of the total area is highlands, 21% are high mountains and 23% are flatlands. Forest crops are the most represented vegetation, about 40 6% of the total country area, ranking Slovakia among European countries with the highest forest coverage.

***Demographic characteristics of SR territory***
The present demographic situation in Slovakia correlates with the overall trends in developed countries, which are characterised by low number of children in families, overall decrease of birth rates, gradual decreasing of mother age and by general ageing of the population.

As to 31 December 2004 the total number of inhabitants reached 5 384 822. The average population density is 110 inhabitants per square kilometre.

Overall ratio of economic activity was 60.2 % in 2004, men 68.5 % and women 52.5 %. Ageing index for 2004 was 111.24 (proportion of men of 60 or more / 55 or more for women to persons of age 0-14) and according to EU methodology 68.12 (proportion of age 65 or more to age 0-14), mean survival age 70.29 men and 77.83 women (2004).

***Number of inhabitants in regions***
When characterising socio-economic situation in the particular regions the number of inhabitants is important as well as their migration between the regions. Population census takes place every ten years; the last census was carried out in the year 2001. The following table shows the number of inhabitants per region for years 1997 to 2004.

**Tab. 2.1.1/1 – Number of inhabitants per region**

| **Number of inhabitants per region** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Region | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Bratislava | 618 673 | 617 599 | 616 982 | 617 049 | 599 042 | 599 736 | 599 787 | 601 132 |
| Trnava | 549 621 | 550 652 | 551 287 | 551 441 | 550 918 | 550 911 | 552 014 | 553 198 |
| Trenčín | 610 349 | 609 739 | 609 288 | 608 786 | 604 917 | 603 494 | 602 166 | 601 392 |
| Nitra | 717 241 | 716 560 | 715 841 | 714 602 | 712 312 | 711 002 | 709 752 | 709 350 |
| Žilina | 689 504 | 691 201 | 692 582 | 693 853 | 692 434 | 693 041 | 693 499 | 694 129 |
| Banská Bystrica | 663 845 | 663 492 | 662 932 | 662 077 | 661 343 | 660 110 | 658 953 | 658 368 |
| Prešov | 777 301 | 780 875 | 784 451 | 787 483 | 791 335 | 793 182 | 794 814 | 796 745 |
| Košice | **761 116** | **763 264** | **765 294** | **767 256** | **766 650** | **767 685** | **769 068** | **770 508** |
| Slovak Republic | 5 387 650 | 5 393 382 | 5 398 657 | 5 402 547 | 5 378 951 | 5 379 161 | 5 380 053 | 5 384 822 |

*Source: ŠÚ SR*

From the point of view of POPs presence, be it in certain equipment or in the environment, it is important to consider the number of inhabitants in the critical region and their concentration near by the sources of POPs releases. Based on the preliminary results of Technical report II from supporting GEF project to NIP elaboration, the Košice Region, in particular the Michalovce District, where the former PCBs producer is located (Chemko Strážske) may be considered as critical. **These substances were not and are not produced nor used** in the other areas of Slovakia.

***Population increase***
Population growth as characterised by natural increase for years 2002 – 2004 is shown in the table below.

**Tab. 2.1.1/2 – Natural population increase per 1000 inhabitants of SR as of 31 December 2004.**

| **Year** | 2002 | 2003 | 2004 |
|---|---|---|---|
| **Increase** | - 0,1 | - 0,1 | 0,4 |

Total population growth takes into consideration besides the natural increase also population migration.

The proportion of population increase is higher in Bratislava region (mostly due to better job opportunities and higher salaries), the decline is higher in Košice and Žilina regions.

## 2.1.2 Political and economical situation

Development of basic macro economical parameters for period 1998 to 2003 (2003 – estimate based on data from 2nd quarter of 2003) is shown below.

**Tab. 2.1.2/1 – Macro economical indicators**

| *Indicator* | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|---|
| *GDP b.c. (SKK bill)* | 781 | 844 | 934 | 1 010 | 1 099 | 1201 |
| *GDP per capita b.c. (thus. SKK)* | 145,0 | 156,5 | 173,0 | 186,9 | 204,2 | 223,3 |
| *GDP growth s.c. (%)* | 4,2 | 1,5 | 2,0 | 3,8 | 4,6 | 4,5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Inflation (%)* | 6,7 | 10,6 | 12,0 | 7,3 | 3,3 | 8,5 |
| *Unemployment (%)* | 13,7 | 17,3 | 18,2 | 18,3 | 17,8 | 15,2 |
| *Avg. monthly gross salary (SKK)* | 10 003 | 10 728 | 11 430 | 12 365 | 13 511 | 14 365 |

*Source: ŠÚ SR*

**Proportion of regions on GDP**

Bratislava region in spite of its smallest geographical surface shares the GDP by highest proportion due to the industrial sectors when compared with the other regions.

Regarding the POPs production and their appearance in the equipment it is necessary to focus to Košice region where the probability of POPs presence in sediments with potential impact to the population health. The highest economical influence of Stockholm Convention implementation to the private sector is foreseen in this region.

**Economy structure and status**

Economy structure of SR according to the sector economical activities codes (OKEC) is presented by the proportion of individual economical activities characterised by average number of employees as well as GDP.

From the POPs perspective, it was important for the economic analysis of GDP to focus on those sectors (economic activities) that are directly related to presence of POPs in equipment and on those sectors that are source of unintentional POPs production. It is therefore essential to consider share of individual sectors on GDP generation, during the assessment of impact of the Stockholm Convention implementation.

**Tab. 2.1.2/2 – Sector categories of economical activities for year 2004**

| Title | | Categories of economical activity (OKEČ) | Average recorded number of employees and sole traders in economy [%] | GDP [mil. Sk] b.c. |
|---|---|---|---|---|
| AB | A | Agriculture, game keeping, forestry, fishery, fish husbandry | 5,79 | 48 151 |
| | B | agriculture from the above | 5,76 | 44 131 |
| C, D, E | Industry total | | 29,29 | 324 953 |
| | C | Raw materials extraction | 8,64 | 6 226 |
| | D | Industrial production | 26,33 | 256 974 |
| | E | Production and distribution of el. power, gas and wate | 2,10 | 61 753 |
| F | Building industry | | 9,00 | 68 518 |
| G | Trade, vehicle and consumer goods repair | | 12,47 | 173 821 |
| H | Hotels and restaurants | | 3,67 | 11 464 |
| I | Transport, storage, post and telecom | | 6,90 | 131 227 |
| J | Banking and insurance | | 2,01 | 83 598 |
| K | Real estates, renting, trade services, research and development | | 5,02 | 177 689 |
| L | Public administration and defence, obligatory social security | | 7,38 | 86 824 |
| M | Education | | 7,31 | 43 009 |
| N | Health and social care | | 7,04 | 45 201 |
| O | Other public, social and personal services | | 3,56 | 31 765 |
| | Other | | 0,41 | 99 266 |

*Source: ŠÚ SR*

The highest proportion of employees in the SR belongs to industry (mainly industrial production) and it also shares the highest proportion of GDP. Industry also shown the highest

absolute grows of GDP during years 2002 – 2005.
Number of employees was reduced in agriculture. The employees increase in building industry shown the activation of building production. Certain increase of employees was also recorded in tertiary sector.

### 2.1.3 Profiles of economy sectors

Definition of those national economy sectors (later on referred to as sectors), which are potential producers of POPs in Slovakia, was based on Annex C to the Stockholm Convention Part II: Source categories, where industrial source categories having the potential for comparatively high formation and release of these chemicals to the environment are identified. In the above part of Annex C, industrial source categories are defined that are potential sources of relatively high appearance and release of those substances to the environment. Some of these sources are sectors (branches) of the national economy, others only activities or even side effects of certain industrial and non-industrial processes. For this reason, the economic analysis was carried out on that level, where the pollution source was assumed and where the socio-economic impact could be described or estimated in certain way.
It is concerning:

- Waste incineration plants,
- Electric power plants and heating plants,
- Pulp production,
- Metallurgical industry,
- Open burning of wastes including landfills,
- Chemical production – unintentional POPs production.

Problems with regard to identification of those national economy sectors, where equipment containing POPs are located, were dealt with separately.

**Waste incineration plants**

With regard to waste incineration plants, it is not possible to identify a certain concerned sector. Waste incineration plants are technical installations, which may fall under various industrial branches, depending on their type, as well us under different kinds of administration. Some of them are operated on commercial bases (they are owned by a private company) while others are included into the public sector. The question of their operation and financing as well as assessment of the economic impact will therefore differ from case to case.

- Municipal / industrial waste incineration plants – in Slovakia is currently about 20 % of waste incinerated in waste incineration plants of different technical levels. There are 15 waste incineration plants for municipal and industrial waste incineration in Slovakia as of 31 December 2004, 2 of them incineration municipal and 13 of them industrial waste. Most waste incineration plants are located in Bratislava (4) and Žilina (4) regions.
- Hazardous waste incineration plants – high quality incineration plants, incinerating high variety of materials.
- Hospital waste incineration plants – level of the incineration plants is different, the quantity of waste incinerated is relatively low, and however, this waste contains high quantities of chlorine. Hospital waste was incinerated in 21 facilities in year 2004. Most incineration plants appear in Trenčín (6) and Nitra (6) regions. Many of this incineration plants do not meet the required emission limits; therefore, it will be necessary to close them down or reconstruct / replace them. In this case, the impact to the health sector will be significant either because of need to finance the

newer technologies or because of need to finance transportation of the waste to be incinerated elsewhere.

**Electric power plants and heating plants**

Electric power plants and heating plants utilising coal and other fossil fuels are also unintentionally producing POPs. In order to operate effectively the incineration technology meets high quality, complies with emission limits. Regarding the POPs production the sectors of heat and energy production belong to the most important ones due to PAH, PCB and NCB emissions.

**Pulp production**

Chlorine and carbon dioxide was used in the past as bleaching agent in pulp and paper production and wood processing. At present is this technology used only by one company – Bukocel Vranov.

Economic impact onto this company will be remarkable as exchange of technology in the required period is not in their possibility. Switch to the new technology requires large investments (about 200 mil SKK), which the company is not in position to secure in a short period of time. From national economy point of view, pulp production in general will be not endangered; neither it's producing nor financing. Other companies (SCP Ružomberok, KAPPA Štúrovo, etc.) will secure it.

However, closing down of the respective company will have a large socio-economic impact in the Vranov district.

**Metallurgical industry**

Annex C of the Stockholm Convention is further listing the following branches of metallurgical industry as potential sources of POPs releases:

- *secondary copper production*
- *sinter plants in the iron and steel industry*
- *secondary aluminium production*
- *secondary zinc production*

Iron and steel industry represents one of the most important industrial sectors in Slovakia. Volumes of raw materials consumed and products produced are very high, thus resulting in biggest share of this sector in total POPs releases in Slovakia. On the other hand, environment protection measures recently were - or are being introduced in this sector and starting with the year 2004, technologies mostly contributing to POPs releases (ore sintering and coke production) will comply with BAT. Secondary non-ferrous metal production is currently not operated in Slovakia.
For these reasons, the potential economic impact in metallurgy sector is considered as minimal.

**Opened burning of wastes, including landfills**

163 waste landfills are recorded in SR at present (31 December 2004). These facilities are constructed in compliance with the actual legal requirements in SR in order to avoid opened burning of waste.

To assess the socio-economic impact of the Stockholm Convention with regard to landfills is similarly difficult as in the case of waste incineration plants, as the landfills are likewise belonging to various sectors and falling under different administrations.

**Chemical production – unintentional POPs production**

Potential unintended POPs producers are producers of organic solvents as well as producers of wood finishing / protecting preparations (bating). There are about 40 organic solvents producers (typical representative of which is for example Novácke Chemické závody, n. p.) and about 35 companies are dealing with production of wood finishing preparations. These companies are usually middle – sized chemical plants with approximate number of employees about 50-250. Monitoring results do not indicate their importance as POPs pollution sources; therefore, economic impact onto this national economy branch will be not significant.

**Localization of POPs containing equipment**

Technical Report No. 2 deals in detail with this problem. POPs-containing equipment may be located within various sectors of national economy.

Mostly concerned are obsolete stocks of PCBs in Chemko Strážske, further unused agrochemical plant - protection preparations, as well as transformers, capacitors and other small equipment, which may be located within almost all national economy sectors. Economic impact is quantified based on expenditure of their destruction.

### 2.1.4 Environmental review

The protection of natural environment in Slovakia is ensured at three levels – territorial protection (general and individual), specific protection (general and individual) and special protection of wood species. It is ranked into five rates, with rate 5. being the most stringent protection rate. Slovakia has at present nine national parks with total area of 317 800 ha and 14 protected landscapes with total area of 525 500 ha. Total land area of individually protected natural environment (rate 2-5) in Slovakia is about 23.3% of the whole country territory. Besides, some of the natural habitats are protected by bilateral agreements, programs of EU (biotope network NATURA 2000) and UN (Man and the Biosphere, UNEP, UNDP) as well as by international treaties and conventions (the Ramsar Agreement, and the European Diploma Sites).

From the point of view of environmental zoning of Slovakia, five steps rating of environment quality is distinguished: I. – high quality environment, II. – satisfactory environment, III. – moderately deteriorated environment, IV. – deteriorated environment, V. – heavily deteriorated environment. About 12 % of total territory of Slovakia, where about 43% of inhabitants is living, is considered to have endangered environment (environment quality rate IV. and V.). These endangered regions are Bratislavská, Trnavskogalantská, Hornonitrianska, Hornopovažská, Strednopohronská, Strednospišská, Strednogemerská, Košická and finally Strednozemplínska region.

***Air***

Data on air pollution sources and their releases are based since 1997 on the National Emission Inventory System (NEIS). NEIS creates a database for whole Slovakia and includes air pollution sources, sorted according to their categorisation and thermal output. Until 1997, the data collection was based on the Registre of Air Pollution Sources (REZZO).

Significant share on total POPs air emissions in Slovakia have in particular the metallurgical industry, the energy sector and waste incineration

***Water***
Slovakia has a relatively high quantity of renewable water resources (83 mld. $m^3$), about 50% of which originates from large river tributaries from neighbouring countries.

With regard to POPs in particular the Laborec River is interesting, mouthing into the Zemplínska šírava water reservoir with water quality classified for certain indicators into classes II – V. The quality of water in the water reservoir is influenced particularly by discharging of municipal and industrial wastewater and by agricultural activities. Contamination of Zemplínska šírava is caused also by long-lasting PCBs production in Chemko Strážske, n.p. It is assumed that during the production several tons of this chemical leaked out into the waste-water effluent channel and subsequently contaminated the Laborec River.

***Soil***
The share of agricultural land on the total land area of Slovakia is about 50%; chemical as well as physical degradation are contributing to its deterioration. Average POPs content (measured as polycyclic aromatic hydrocarbons) in agricultural soils is on background levels (around 200 μg.kg-1). The higher concentrations were measured locally in the vicinity of industrial installations – in the area of Žiar nad Hronom and Strážske.

For other (forest) soils, no relevant data on POPs concentration are available.

***Biota***
Besides long-term persistence of POPs in the environment and biota, ability to bio-concentrate in fatty tissues and long degradation halftime in living organisms and components of environment are their most dangerous properties.

Based on the monitoring of contaminants in foodstuff and feeding-stuff (monitoring of hunting wildlife and fish) is evident that highest exceeding of the permitted limits takes place in the region of Eastern Slovakia, particularly in Zemplínska šírava, Chemko Strážske effluent channel and in the Laborec River. POPs contents estimated in fish usually exceeded the limits by 10 to 100 times, in some cases even by 500 to 600 times.

While analysing milk and meet of household animals from this region no important exceeding of POPs limit values was measured; however, according to a survey of POPs content in wildlife, permitted limits were multiplied in some cases.

**Environmental status**

Regional characteristics according to the area type are listed in the table below. The differences between individual areas show different landscape types as well. Forest landscape is typical mostly for Prešov and Banská Bystrica regions. Most urbanised area surrounds the capital Bratislava.

**Tab. 2.1.4/1 – Area structure of Slovak regions, hectares**

| Region | Plough soil | Agricult. soil* | Forest | Water surface | Built areas | Other** |
|---|---|---|---|---|---|---|
| **Bratislava** | 46 141 | 66 012 | 75 429 | 5 582 | 14 230 | 19 683 |
| **Trnava** | 264 323 | 294 322 | 65 205 | 14 363 | 26 546 | 28 650 |
| **Trenčín** | 100 097 | 186 891 | 220 537 | 6 296 | 22 601 | 20 164 |
| **Nitra** | 407 032 | 469 763 | 96 094 | 15 653 | 37 088 | 31 428 |
| **Žilina** | 64 437 | 248 067 | 376 191 | 12 814 | 24 591 | 31 210 |
| **Banská Bystrica** | 168 621 | 419 634 | 462 113 | 7 861 | 32 660 | 31 117 |
| **Prešov** | 154 921 | 218 055 | 440 504 | 14 131 | 30 861 | 40 459 |
| **Košice** | 205 591 | 338 469 | 266 056 | 16 231 | 33 898 | 36 715 |
| **SR** | **1 411 163** | **2 439 408** | **2 002 129** | **92 932** | **222 475** | **146 404** |

Source: ŠÚ SR

*plough and agriculture soil differ by hops, wine yards and fruit orchard.
** Other areas incl. water surfaces.

Environmental status of Slovak regions is characterised by environmental regionalisation, which distinguishes 5 levels of environmental status.
Selected data on environmental regionalisation per Slovak regions are shown in Tables No. 2.1.4/2 and No. 2.1.4/3.

**Tab. 2.1.4/2 – Environmental status in Slovak regions**

| Region | PROPORTION ON THE ENVIRONMENTAL REGIONALISATION LEVELS SR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Surface proportion (area, km$^2$) | | | | | | Percentual surface (area, %) | | | | |
| | 1.level | 2. level | 3. level | 4. level | 5. level | total | 1. level | 2. level | 3. level | 4. level | 5. level |
| **Bratislava** | 400,158 | 667,944 | 7,256 | 798,487 | 181,634 | 2055,479 | 19,47 | 32,50 | 0,35 | 38,85 | 8,84 |
| **Trnava** | 270,269 | 2044,532 | 99,234 | 1549,665 | 182,484 | 4146,184 | 6,52 | 49,31 | 2,39 | 37,38 | 4,40 |
| **Trenčín** | 2681,507 | 1061,359 | 10,393 | 619,014 | 129,375 | 4501,648 | 59,57 | 23,58 | 0,23 | 13,75 | 2,87 |
| **Nitra** | 456,989 | 2542,775 | 708,127 | 2379,760 | 251,798 | 6339,449 | 7,21 | 40,11 | 11,17 | 37,54 | 3,97 |
| **Žilina** | 4841,843 | 664,536 | 378,976 | 663,444 | 244,179 | 6792,978 | 71,28 | 9,78 | 5,58 | 9,77 | 3,59 |
| **Banská Bystrica** | 5393,095 | 1194,883 | 1001,859 | 1472,433 | 393,609 | 9455,879 | 57,03 | 12,64 | 10,60 | 15,57 | 4,16 |
| **Prešov** | 4551,141 | 3032,599 | 433,122 | 906,117 | 72,997 | 8995,976 | 50,59 | 33,71 | 4,81 | 10,07 | 0,81 |
| **Košice** | 2495,877 | 1098,170 | 647,283 | 1918,496 | 588,652 | 6748,478 | 36,98 | 16,27 | 9,59 | 28,43 | 8,72 |
| **SLOVAKIA** | **21090,879** | **12306,798** | **3286,250** | **10307,416** | **2044,728** | **49036,071** | **43,01** | **25,10** | **6,70** | **21,02** | **4,17** |

Source: SEA

**Tab. 2.1.4/3 – Number of inhabitants influenced by environmental status in SR**

| Region | PROPORTION ON THE ENVIRONMENTAL REGIONALISATION LEVELS SR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of impacted inhabitants | | | | | | % of impacted inhabitants | | | | |
| | 1.level | 2. level | 3. level | 4. level | 5. level | total | 1. level | 2. level | 3. level | 4. level | 5. level |
| **Bratislava** | 11 529 | 55 936 | 17 773 | 166 691 | 347 086 | 599 015 | 1,92 | 9,34 | 2,97 | 27,83 | 57,94 |
| **Trnava** | 7 649 | 196 272 | 15 251 | 289 618 | 42 213 | 551 003 | 1,39 | 35,62 | 2,77 | 52,56 | 7,66 |
| **Trenčín** | 226 351 | 122 544 | 0 | 162 559 | 94 128 | 605 582 | 37,38 | 20,24 | 0,00 | 26,84 | 15,54 |
| **Nitra** | 16 426 | 172 935 | 46 016 | 265 624 | 212 421 | 713 422 | 2,30 | 24,24 | 6,45 | 37,23 | 29,77 |
| **Žilina** | 227 795 | 38 201 | 46 405 | 216 667 | 163 264 | 692 332 | 32,90 | 5,52 | 6,70 | 31,30 | 23,58 |
| **Banská Bystrica** | 194 922 | 47 066 | 77 009 | 151 859 | 191 886 | 662 742 | 29,41 | 7,10 | 11,62 | 22,91 | 28,95 |
| **Prešov** | 160 541 | 215 779 | 56 619 | 260 045 | 96 973 | 789 957 | 20,32 | 27,32 | 7,17 | 32,92 | 12,28 |
| **Košice** | 83 015 | 70 807 | 36 154 | 273 841 | 302 195 | 766 012 | 10,84 | 9,24 | 4,72 | 35,75 | 39,45 |
| **SLOVAKIA** | **928 228** | **919 540** | **295 227** | **1 786 904** | **1 450 166** | **5 380 065** | **17,25** | **17,09** | **5,49** | **33,21** | **26,95** |

Source: SEA

## *2.2 Institutional, Political and Regulatory Framework*

### 2.2.1 Environmental policy, sustainable development policy, main legislative framework

Environmental policy of the SR is based on the UN Environmental Summit in Rio de Janeiro outputs (1992) entitled Agenda 21 and the corresponding strategically document „Strategy, Principles and Priorities of State Environmental Policy“ approved by Government decision No. 619/1993.

National SD Strategy of the SR approved by Government of the SR 978/2001 serves as a basis for Action plan for sustainable development SR for years 2006 – 2010 (under preparation) activities of which will serve also as a basis for status improvement in the POPs management issues.

Collection of Acts SR is a background of legislative framework and it is constituted by Act No. 1/1993 Coll., contains both Slovak acts as well as international agreements.

### 2.2.2 Roles and responsibilities of ministries, agencies and other governmental organisations

Legal regulation of POPs recording, monitoring and management and their institutional support currently overlaps among several government ministries. They are Ministries of Healthcare (foodstuff and articles of daily use, working environment), Environment (air, water and wastes), Agriculture (compounds for protection of plants, soil and foodstuff) and Economy (chemical compounds and chemical products).

Institutional securing of POPs management currently includes also the Ministry of Finance (customs institutions) and the Ministry of Interior (regional and district offices). Competencies in this area have been since January 1, 2004 transferred to specialised public administration – Environment Offices and Public Healthcare Offices.

Regarding the institutional background for implementation of the Stockholm Convention, partial recording, partial monitoring and partial management of POPs are on agenda of following institutions:

1. Centre for Chemical Compounds and Preparations (under Ministry of Health)
2. Public Health Institutes (until 31.12.2003 state healthcare institutes)
3. Central Agricultural Inspecting and Testing Institute (under Ministry of Agriculture)
4. State Veterinary and Food Institute (under Ministry of Agriculture)
5. Foodstuff Research Institute (under Ministry of Agriculture)
6. Slovak Hydrometeorological Institute (under Ministry of Environment)
7. Slovak Environmental Agency (under Ministry of Environment)
8. Slovak Environmental Inspectorate(under Ministry of Environment)
9. State Energetic Inspectorate (under Ministry of Economy).

The list of these institutions is not final; the POPs-related issues are partially on agenda of several institutes of Slovak Academy of Sciences and research institutes belonging under different ministries.

### 2.2.3 Relevant international liabilities and resulting obligations

According to the Stockholm Convention aim that is human health and environmental protection against negative impacts of POPs, and in compliance with articles 3 and 6 of the Convention Slovakia is also a party of Basel Convention on the governance of transboundary movement of dangerous waste and their disposal, that was published in the Collection of Acts SR. The issue was in particular as follows.

- Announcement of Ministry of Foreign Affairs SR No. 60/1995 Coll. on accession of the SR to the Basel Convention on the governance of transboundary movement of dangerous waste and their disposal.

- Announcement of Ministry of Foreign Affairs SR No. 132/2000 Coll. on amendment in Annex 1 and on acceptation of two new annexes VIII and IX of the Basel Convention on governance of transboundary movement of dangerous waste and their disposal.

As regards the Rotterdam Convention implementation on previous information consent for certain dangerous chemicals and plant protection preparations in the international trade it is necessary to notice that SR is preparing signing of this agreement. SR applies appropriate measures of this agreement via EP and EC Regulation No. 304/2003 on export and import of dangerous chemicals. Act No. 163/2002 Coll. on chemical substances and preparations as amended by Act No. 128/2002 Coll., Act No. 217/2003 Coll., Act No. 434/2004 Coll. and Act No. 308/2005 Coll. deals with import and export of dangerous chemicals in the actual Slovak legislation.

The Collection of Slovak Acts issued also following documents:

- Announcement of Slovak Ministry of Foreign Affairs No. 367/2003 on acceptance of Protocol on POPs to the Convention on transboundary long distance air pollution and on validity for Slovakia since 23 October 2003.

- Announcement of Slovak Ministry of Foreign Affairs No. 593/2004 on acceptance of Stockholm Convention on POPs and on validity for Slovakia since 17 May 2004.

In accordance with Act No. 416/2004 Coll., § 2 on EU Official Journal it pays that legally binding acts of European Communities and legally binding acts of European Union that are published in the Official Journal of European Communities or Official Journal of European Union became known to everyone who is touched, while the presumption of knowledge of issued legally binding acts of European Communities and European Union is irrefutable.

According to the same act also the Regulation (EC) No. 850/2004 on POPs from 29 April 2004, is valid in Slovakia that was published on 30 April 2004 in the Official Journal of European Union, coming into force on 20 May 2004.

### 2.2.4 Description of current legislation in the POPs issues

In relation to the mentioned above international documents, Act No. 127/2006 Coll. on persistent organic pollutants and on amendment of Act. No. 223/2001 Coll. on waste and its amendments was prepared.

The most influenced relevant legal documents linked to the Stockholm Convention implementation are as follows:

- Act on chemical substances (No. 163/2001 Coll. on chemicals as amended by Act No. 128/2002 Coll. Act No. 217/2003 Coll., Act No. 434/2004 Coll. and Act No. 308/2005 Coll.),

- Waste Act (No. 223/2001 Coll. on waste and on amendment of certain acts linked to Act No. 553/2001 Coll., Act No. 96/2002 Coll. 261/2002 Coll., 393/2002 Coll., 529/2002 Coll., 188/2003 Coll., (plus erratum announced in Section 98 Coll. 2003), Act No. 245/2003 Coll., 525/2003 Coll., 24/2004 Coll..(plus erratum announced in Section 44 Coll. 2004), Act No. 443/2004 Coll., 587/2004 Coll., 733/2004 Coll., 479/2005 Coll. 532/2005 Coll., 571/2005 Coll., and Act No. 127/2006 Coll.),

- Air Act (No. 478/2002 on air protection amending Act 401/1998 Coll. on payments for air pollution as amended by Act No. 245/2003 Coll., 525/2003 Coll., 541/2004 Coll., 572/2004 Coll., 587/2004 Coll., 725/2004 coll., 230/2005 Coll.479/2005 Coll., 532/2005 Coll., and Act No. 571/2005 Coll.),

- Act on serious industrial accident prevention (No. 261/2002 Coll. on serious industrial accidents prevention and on amendment of certain acts as worded by later regulations),

- Act on biocides (No. 217/2003 Coll. concerning the placing of biocidal products on the market and on amendment of certain acts as worded by Act No. 434/2004 Coll. and No. 15/2006 Coll.),

- Water Act (No.364/2004 Coll. on waters and on amendment of Act No. 372/1990 Coll. on violations as worded by later regulations of Act No. 587/2004 Coll., 230/2005 Coll., 479/2005 Coll. and 532/2005 Coll.),

- IPPC Act (No.245/2003 Coll. on integrated pollution prevention and control and on amendment of certain acts as worded by. Act No. 205/2004 Coll., 220/2004 Coll., 572/2004 Coll. 587/2004 Coll. and 532/2005 Coll.),

- Act on plant protection care (No. 193/2005 Coll. on plant protection care as amended by later regulations),

- SR Government Regulation No. 531/2005 Coll. on the requirements for placing of plant protection products on the SR market.

### 2.2.5 Key approaches and procedures of POPs chemicals and pesticides management

Analysis of laws that are currently in force and of Stockholm Convention and EP&C Regulation provisions leads to following conclusions:

- absence of unambiguous legal ban (or other administrative tool for exclusion) of production (introduction to the market) of 9 chemical compounds listed in Annex A of Stockholm Convention, or of restriction of production of those chemical compounds
- absence of appropriate legal document in the field of identification of areas contaminated by chemicals listed in Annex A, B or C of Stockholm Convention , as well as their remediation,
- need to justify the information access (including possible participation on decision making), education and awareness increase of public (including management and employees of relevant operators) according to article 10 of Stockholm Convention,
- complex monitoring of sources and releases to the environment and transport of POPs in it including harmonisation of appropriate methods and procedures, as well as timely and regular access of monitoring results to public.

Improvement of this situation will be reached in the framework of harmonised approach of EU member states and its co-ordination activities.

Active participation on the working meetings organised by EU institutions is secured permanently, that are aimed at identification of procedures and institutional mechanisms of recognition of non compliance of the obligations of this convention, as well as handling with parties who are found to breach their obligations.

Moreover, acknowledgement of proposal for the guideline for revision and update of national implementation plans for Stockholm Convention on POPs is also important, as well as horizontal issues of POPs monitoring, reporting and proposals for legal regime of amendment of POPs lists in the Stockholm Convention annexes on POPs in order to ensure feasible measures at appropriate level.

Involvement to the discussion on the issues of limit concentrations of POPs in waste is also ensured, in order to secure environmentally sound handling with so called POPs wastes, i.e. wastes comprising POPs, containing POPs or contaminated by POPs, and to contribute to human health and environmental protection.

Two new EU legal documents came into force in Slovakia since 2006, namely:
- Council Decision 2006/61/EC on closure of UN-ECE Protocol on pollutants release and transport registers on behalf of European Community,
- Regulation (EC) No. 166/2006 of European Parliament and Council on establishment of Pollutant Release and Transfer Registers (E-PRTR) and on Council Directives 61/689/EEC and 96/61/EC amendment.

Annex 2 of both legal documents lists the pollutants relevant to E-PRTR. This list contains all POPs including PCDD/PCDF, HCB, PCBs and PAHs.
These documents are binding for Slovakia as an EU member state.

## *2.3 Evaluation of POPs Issues in the Country*

The following chapters were elaborated according to the available information on the real status of POPs issues in the SR. They are in compliance with recommended structure in the European Commission document No. ENV/C.3/D(2005) from 30 January 2005, and their extent corresponds to the topics defined in the individual articles of Stockholm Convention including available data on inventory, monitoring, capacity management and public relations.

### 2.3.1. Evaluation of POPs pesticides (including DDT)

**Introduction**

POPs pesticides belong to the group of most bio-active substances, which are directly introduced into various components of the environment, and may significantly endanger ecosystems and human health in areas with intensive agriculture. Health effects of this substance group are based on the facts that they are effective also in very law concentrations, practically ubiquitous and are present also in remote regions, far from their production, storage or application sites. POPs pesticides degrade in the environment only very slowly, and concentrate mainly in fatty tissues due to bioaccumulation. In this way, they are still present in the environmental media or in human and animal tissues even decades after cessation of their use. Typical examples are DDT, Mirex and others.

**Requirements of the Stockholm Convention**

With regard to pesticides, the Stockholm Convention concentrates on reduction of their production and use. Because of actual broad present uses of DDT for malaria control, possible exemptions for countries, combating vector-based diseases, are dealt with separately.

Following are the basic provisions:

1.a) i Each party shall prohibit and/or take the legal and administrative measures necessary to eliminate its production and use of the chemicals listed in Annex A

1.a)ii Each party shall prohibit and/or take the legal and administrative measures necessary to eliminate its import and expert of the chemicals listed in Annex A

1.b) Each party shall restrict its production and use of the chemicals listed in Annex B (DDT)

2.a)i Each party shall take measures to ensure that a chemical listed in Annex A or Annex B is imported only for the purpose of environmentally sound disposal.

2.a)ii Each party shall take measures to ensure that a chemical listed in Annex A or Annex B is imported only for the purpose which is permitted for that party.

2.b) Slovak Republic neither has any specific exemption under the Convention nor a reason to ask for it.

2.c) Each party shall take measures to ensure that a chemical listed in Annex A is not exported from it except for the purpose of environmentally sound disposal.

3. Each party that has one or more regulation and assessment schemes for new pesticides or new industrial chemicals shall take measures to regulate with the aim of preventing the production and use of new pesticides or new industrial chemicals which, taking into consideration the criteria in paragraph 1 of Annex D, exhibit the characteristics of persistent organic pollutants.

4. Each party that has one or more regulation and assessment schemes for pesticides or industrial chemicals shall, where appropriate, take into consideration within this schemes the criteria in paragraph 1 Annex D when conducting assessments of pesticides or industrial chemicals currently in use.

**Situation in the Slovak Republic**

POPs pesticides represent a large group of POPs-substances, whose elimination is stipulated in the Stockholm Convention with great emphasis. From the point of view of Slovakia, is relevant in particular the problem of obsolete stockpiles and possible illegal importing of plant protection preparations, containing POPs based active ingredients. Nowadays, neither production nor use of POPs pesticides takes place in Slovakia.

A Registration Committee under the Ministry of Agriculture of Slovakia, with membership of further state authorities such as the Ministries of Health and Environment, has the competence of permitting plant protection preparations, as well as preparations for disinfection, disinfestation and rodent control. According to the Article 3 Para. 1 Act on biocides, a biocide product may be introduced onto the market only upon decision of the Centre for Chemical Substances and Preparations.

Historically, (since the period of Czechoslovak Federation) a so-called “positive list” of permitted plant protection preparations is issued. According to this, substances that are not included in this list may not be used for the given purposes.

The corresponding Community legislation (Council Directive 91/414/EEC on on the requirements for placing of plant protection products on the market, Council Directive 79/117/EEC) are transposed into the Act 193/2005 Coll. on plant protection care, Government Decision 531/2005 Coll. pursuing the details of plant protection preparations as worded in amendments of Ministry of Agriculture Decree No. 3322/3/2001-100 stating details of plant protection preparations.
All POPs pesticides are included also in the list of substances, falling under the PIC-procedure (*Prior Informed Consent*), being also an integral part of chemical legislation in Slovakia. The PIC –procedure is ensuring the necessary consent of the importing country with import of a substance, being included in this list. Numerous POPs pesticides belong to substances, whose use is banned or severely restricted in Slovakia.

As far as it is possible to find out, POPs pesticides were never produced in the territory of Slovakia or Czechoslovakia respectively. With regard to the neighbouring states, for example in Poland such production took place and active pesticide substance Mirex was produced. However, POPs pesticides were imported to Slovakia and some plants used them to formulate plant protection preparations.

Control of stored, used, transported plant protection preparations are done by phytoinspector of Central Agricultural Inspecting and Testing Institute (CAITI) according to the Act on plant

protection
No. 193/2005 Coll., Governmental Regulation No. 531/2005 Coll. on the requirements for placing of plant protection products on the market, as well as decree of Ministry of Economy No. 3322/3/2001-100 that pursue the details for plant protection preparations.

During the last five years, CAITI carried out such a survey twice. The first survey was assigned to the inspectors on 23 February 2000, with deadline by 30 June 2000. Baseline documents to elaborate a PHARE project proposal, covered out from the EU funds, for ultimate destruction of these preparations should have been produced by this survey. This project was not implemented in the end. It is estimated that about 60 % of all plant protection preparation stores have been inspected during this survey. This was mainly because plant inspectors carried out this task along with their usual duties and not as a separate assignment. Besides the state of preparation-stockpiles, state of empty packing was surveyed as well, but the best before date was not investigated. Of course, also POPs preparations were included in the overviews of obsolete stockpiles.

The second survey was assigned to the inspectors on 22 November 2002. This task was implied also by negotiations during the EC DG (SANCO) 8694/2002 Mission, carried out by the Food and Veterinary Office in Dublin during 14 to 18 of October in Slovakia, with the aim to assess the system of pest control and the inspection system of introduction of plant protection preparations onto the market and in use.

Based on the newer investigations, totally 17 899.5 kg of POPs pesticides were documented in the SR during POPs pesticides inventory up to 15 February 2006.

**Identification of problems**

Priority problems in the field of POPs pesticides are concerning mainly completion of stockpiles inventory and their environmentally sound destruction.

- final investigation of stockpiles in order to timely insurance of their safe storage till destruction,
- preparation and assurance of destruction of chlorinated POPs pesticides by an environmentally sound way,
- performance of activities facilitating to identify exposure routes of population and environmental sectors,
- elaboration and assurance of measures for reduction of population burden by POPs pesticides.

As potential problems for Slovakia, following issues may be pointed out:

- Co-operation of plant inspectors with the Slovak Environmental Inspectorate (SEI),
- Safe storage,
- Definition of environmentally sound destruction manner,
- State support of the ultimate destruction of POPs pesticides,
- Measures to reduce exposure of inhabitants.

### 2.3.2 Evaluation regarding PCBs

**Introduction**

Polychlorinated biphenyls (PCBs) and equipment containing PCBs (contaminated equipment) represent a serious problem for Slovakia from the point of view of the Stockholm Convention requirements. This is the reason why particular attention is needed in order to meet the Stockholm Convention requirements as well as the requirements of respective EU directives.

PCBs were produced in the Slovak Republic during the years 1959-1984 in Chemko Strážske company. Altogether 21 000 tons were produced. About 600 tons of production residues are still stored at the production site. In Czech Republic manufacturing of PCBs containing equipment was linked to the PCBs production, in particular the broad variety of capacitors in the company ZEZ Žamberk, but also PCBs use in production of paints and varnishes. Thus, during the period of common state, PCBs were broadly used in various applications, contaminating the environment and leading to high population exposure.

With regard to environmental burdens concerning different components of the environment, major problems are concentrated in the Zemplín district (Strážske and Michalovce) into sediments and soil contamination of as well as near asphalt mixing plants, where PCBs containing heat-exchange fluids were broadly used.

As regards the continuing usage of equipment containing PCB (the life span of transformers and capacitors being estimated up to 30 to 50 years) this is a regional issue. Based on the results of inventory SEA has recorded more than 38 000 pcs of contaminated equipment in operation. It is presumed that more than 3 500 tonnes of PCB wastes including out-of-use equipment is present in Slovak territory.

**Requirements of the Stockholm Convention**

Polychlorinated biphenyls are subject to the separate Part II of Annex A, where following obligations are stipulated:

Each party:

(a) With regard to the elimination of the use of polychlorinated biphenyls in equipment (e.g. transformers, capacitors, or other receptacles containing liquid stocks) by 2025, subject to review by the Conference of the Parties, take action in accordance with the following priorities:
    (i) Make determined efforts to identify, label and remove from use equipment containing greater than 10 per cent polychlorinated biphenyls and volumes greater than 5 litters;
    (ii) Make determined efforts to identify, label, and remove from use equipment containing greater than 0.05 per cents polychlorinated biphenyls and volumes greater than 5 litters;
    (iii) Endeavour to identify and remove from use equipment containing greater than 0.005 per cent polychlorinated biphenyls and volumes greater than 0.05 litters;

(b) Consistent with the priorities in subparagraph (a) promote the following measures to reduce exposures and risk to control the use of polychlorinated biphenyls:

(i) Use only in intact and non-leaking equipment and only in areas where the risk from environmental release can be minimised or quickly remedied;
(ii) Not use in equipment in areas associated with the production or processing of food or feed;
(iii) When used in populated areas, including schools and hospitals, all reasonable measures to protect from electrical failure which could result in a fire, and regular inspection of equipment for leaks;

(c) Notwithstanding paragraph 2 of Article 3, ensure that equipment containing polychlorinated biphenyls, as described in subparagraph (a), shall not be exported or imported except for the purpose of environmentally sound waste management;

(d) Except for maintenance and servicing operations, not allow recovery for the purpose of reuse in other equipment of liquids with polychlorinated biphenyls content above 0.005 per cent;

(e) Make determined efforts designed to lead to environmentally sound waste management of liquids containing polychlorinated biphenyls and equipment contaminated with polychlorinated biphenyls having a polychlorinated biphenyls content above 0.005 per cent in accordance with paragraph 1 of Article 6 as soon as possible but not later than 2028, subject to review by the Conference of the Parties;

(f) In lieu of note (ii) in Part I of this Annex, endeavour to identify other articles containing more than 0.005 per cent polychlorinated biphenyls (e.g. cable-sheets, cured caulk and painted objects) and manage them in accordance with paragraph 1 of Article 6;

(g) Provide report every five years on progress in eliminating polychlorinated biphenyls and submit it to the Conference of the Parties pursuant to Article 15;

(h) The reports described in subparagraph (g) shall, as appropriate, be considered by the Conference of the Parties in its reviews relating to polychlorinated biphenyls. The Conference of the Parties shall review progress towards elimination of polychlorinated biphenyls at five years intervals or other period, as appropriate, taking into account such reports.

SR as a new EU member state is obliged to implement the legal standards of EU into its national legislation and it accepted Council Directive 96/59/EC on disposal of PCB/PCT in 2004. This Directive was implemented by Waste Act. **The holders of contaminated equipment are obliged to assure their phase out and destruction or decontamination not later than 31 December 2010.**
The Order of Ministry of Environment No. 135/2004 Coll. regulates the details on PCB decontamination, reference methods for PCB presence in decontaminated equipment, facilities, materials and liquids, way of labelling and technical requirements for PCB destruction methods other than incineration.
PCB holders are obliged to elaborate and to deliver for approval a „PCB holder programs“ to the appropriate state administration body. They define by this programme their own opinion and timeframe for destruction of used PCBs, i.e. PCB waste or decontamination of equipment, not later than 31 December 2005. When the PCB holder is also waste producer and he has elaborated and approved waste management plan, he can elaborate and deliver the „**PCB holder programme**“ as a complement to this waste programme.

EU Official Journal published Regulation (EC) 850/2004 on POPs on 30 April 2004, and the requirements of this document are implemented in the Act No. 127/2006 Coll. on POPs.

**Situation in the Slovak Republic**

PCBs production started in the thirties of previous century, and they were broadly utilised in the industry (in transformers, capacitors, as hydraulic fluids, heat-exchange fluids, plasticizers, cured caulk, impregnation, paints, varnishes, additives to building materials, lubricants, flame retardants, pesticides etc. ). PCBs were produced in the company Chemko Strážske in 1959 – 1984 under product names Delor, Hydelor and Delotherm. Altogether, more than 21 000 tons of PCBs products were manufactured. It is assumed that considering exports, still about 7 000 tons of these materials remain in the territory of former Czechoslovakia.

In the components of environment, PCBs are evaporating into the ambient air from PCBs contaminated materials and landfills. In water media, due to their strong adsorption properties, PCBs usually concentrate in sediments. They do not tend to spread in soils thanks to their adsorption properties and low water solubility.

PCBs destruction is very slow – the slower, the more chlorinated they are. According to recent investigations from 1998, their half-live period in air is estimated to be 3-21 days, in water more than 5 days and in soils more than 40 days (what means total decomposition only after several years). In addition, biodegradation with help of microorganisms is slow. PCBs may also get into plants and accumulate in some of them. Via vegetal food but also directly from water these compounds may get also into living organisms.

In humans, PCBs accumulate mainly in fatty tissues, and may be gradually in long terms released from the fat cells into the blood circulation. Important is also the fact that they are contained also in fatty components of mother milk and PCBs thus may get also into the organisms of newborn.

In 1989, the World Health Organisation (WHO) considered as acceptable daily intake (ADI) 10 picograms of PCBs per kilogram of body-weight. However, currently are the ADI-values set in some countries (USA, Germany) much more stringent. For example, acceptable daily intake for PCBs and dioxins together is considered 1 picogram per kilogram of body-weight.

***Performance of inventories of contaminated equipment***

The initial inventory in the SR was carried out in two phases.

*Phase 1*
The first contaminated equipment inventory was performed by company Ecotoxicological Centre Bratislava in the framework of project of Ministry of Environment „*Inventory of PCB Containing Equipment in SR*“. Methodology for inventory performance with manual for equipment identification, PCB presence confirmation, PCB concentration investigation, distinguishing of equipment potentially containing PCBs and equipment labelling were done.

*Phase 2*
In the framework of project „ Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)” a voluntary

inventory was performed, and it comprised also inventory of wastes and unintended POPs production. The identification of equipment applied the methodology developed in 2001, and it resulted in creation of 524 bodies marked as potential holders of contaminated equipment. According to the data analysis it is evident that more than 40 % of equipment was unidentifiable due to the technical documentation absence, i.e. lack of information on type and content.

Nearly **31 000 pcs of contaminated equipment were recorded** as follows:

i. Capacitors – 30 000
ii. Transformers – 400
iii. Others – 400

In addition to the contaminated equipment (most of them being still in operation) also PCB waste stocks of different type were found.

Estimated **total amount of PCB waste** from Chemko production reaches approximately **600 tonnes**, e.g. different types of wastes, polluted clothes, other materials etc.

**1500 tonnes of different wastes,** mostly in agricultural sector are made from contaminated hydraulic oils, transformer oils, containing PCBs, scrape-off of PCB paints, contaminated concrete blocks et.

Moreover, in the **landfill called Pláne** additional app. **900 tonnes of PCB production waste** were found. The safety of land filling is regularly checked and monitored and thank to the installation of sealing „Milano walls" no pollution of the surrounding land was recorded.

According to the available data from second phase of inventory the total amount of **PCB wastes and contaminated equipment in SR reached app. 3 500 tonnes**.

<u>On-going inventory according to the SR legislative obligations</u>

Acceptance of obligations as well as implementation of EU legal requirements created legal framework for insurance of control of handling with contaminated equipment, stockpiles and PCB production wastes in the SR since 2004. Waste act entered into force in 2004, and it fully implements Council Directive 96/59/EC on disposal of PCB and PCT. Database of contaminated equipment became obligatory due to these documents. The holders of equipment are obliged to report to the Slovak Environmental Agency as an organisation designated by ministry (Centre of Waste Environmental Management – SEA CWEM). This institution is charged to manage and update the list of contaminated equipment **not later than 28 February 2004.**
Equipment holders were obliged to report by filled form the possession of all equipment not later than one month since they obtained the equipment. In the frame of this obligation SEA CWEM record the following data:

- identification of holder,
- identification of the equipment site,
- identification of the equipment:
    i. type/category
    ii. production date
    iii. serial number
    iv. amount of PCBs [kg, l]

v. handling (decontamination, disposal, collection in order to deliver for disposal or destruction, analysis for PCB confirmation, verification of PCB absence according to technical documentation from producer)
vi. company who performed the change, date of change

Every piece of equipment containing more than 5 $dm^3$ of PCBs are subject of inventory, in the case of transformers the limit is PCB media content between 0.005 and 0.05 % of weight.

According to the up-to-date results of inventory SEA CWEM records totally **38 100 pcs of contaminated equipment in operation** till July 30 2006, namely:

i. 37 800 capacitors
ii. 225 transformers
iii. 76 other equipment.

The differences between the numbers of recorded pieces of equipment when compared with the voluntary inventory done in 2001 may be explained by gradual destruction of recorded equipment and their rejection from database. App. **4 200 pcs of contaminated equipment were destructed** till 31 July 2005. On the other hand, additional identified equipment is recorded when reported by subjects entering the inventory.

Data on PCB amount in the equipment as stated in the forms do not have the requested quality always and unequivocal identification of PCB content is not always possible.
Based on the expert judgement one can assume that **more than 750 tonnes of contaminated equipment** is located in Slovakia.

It is necessary to emphasise that the inventory is still on-going and SEA CWEM continuously updates the data on contaminated equipment according to the announcements reported by the holders. It is foreseen that the total number will be increased.

The actual inventory results confirmed that equipment holders belong to both, state and private sectors. Inventory in education sector is not significant, mostly for primary schools. Also municipalities may hold unknown amounts of contaminated equipment, mainly capacitors in different buildings, or transformers not recorded by the distribution enterprises. PCB equipment management in agricultural sector seems difficult. Based on the inventory performed by State Veterinary Administration during years 1999 and 2004 and 2005 the agricultural enterprises have more than 1000 tonnes of PCB wastes and equipment. There is a reasonable doubt that without state support scheme for collection and disposal of these wastes, significant releases may occur and serious negative impacts to the environmental compartments may be caused.

Pollution of the opened industrial channel in Strážske and downstream river Laborec s well as water dam Zemplínska Šírava create very important problem, as revealed by PCB waste inventory in year 2001. This site is under high pressure of pollution that results in certain limitations of water environment functions, in parallel with risk for site inhabitants (mainly some target groups). As PCBs are bound to bottom sediments, the pollution is gradually transferred downstream to the other water streams. Alternatively, pollution of sedimentation areas downstream is increasing – as documented in water dam Zemplínska Šírava. Immediate remediation of sites polluted by PCBs seems to be the most important task from the population health burden point of view.

**Identification of problems**

With regard to PCBs and to PCBs-containing equipment as problem areas the following issues may be defined:

- Stockpiles of obsolete wastes and stored PCBs stocks
- Use and gradual remove from use of equipment containing PCBs
- Safe and environmentally sound destruction and disposal of PCBs and PCBs wastes
- environmental compartments contamination and population health risk in Zemplín district

Following issue may be pointed out as potentially problematic:

- Inventory of PCBs containing equipment,
- Safe storage and handling,
- Definition of environmentally sound disposal,
- Time frame for elimination and disposal of PCBs and contaminated equipment,
- Decontamination of polluted areas,
- Measures for population exposure reduction.

### 2.3.3 Evaluation of releases from unintended production

The Stockholm Convention identifies as unintended POPs by-products PCDD (polychlorinated dibenzo-p-dioxins), PCDF (polychlorinated dibenzofurans), PCBs (polychlorinated biphenyls) and HCB (hexachlorobenzene). Subject of the POPs Protocol to the UN ECE Convention on Long-range Transboundary Air Pollution (hereafter referred to as „POPs Protocol“) are in addition PAHs (polycyclic aromatic hydrocarbons).

Unintended POPs by-products are unwanted by-products, generated and released by certain thermal and chemical processes, particularly if organic matter is present under higher temperature and relatively low or no oxygen concentration.

Depending on process type releases of unintended POPs by-products to air (e.g. from incineration), to products (PVC production), to land and to solid wastes (e.g. production of bleached pulp) and rarely also to water, may be prevailing.

**Requirements of the Stockholm Convention**

The goal of the Stockholm Convention (Article 5) is continuing minimisation and, where feasible, ultimate elimination of unintentional POPs production. Countries shall achieve this goal by a set of measures such as elimination of sources; exchange of materials, products and/or processes; and above all, by introduction of BAT and BEP for activities contributing to POPs releases.

It is required to develop an implementation schedule for BAT and BEP use in new sources within the priority categories as identified by the respective country, focusing particularly on source categories as identified in Part II of Annex C to the Stockholm Convention.

For existing sources operation under best technically feasible conditions of the given technology is required. At the same time, countries should promote gradual implementation of BAT also for existing sources.

**Situation in the Slovak Republic**

The legislation in Slovakia, in compliance with the EU legislation, is gradually enlarging the general requirement that certain anthropogenic activities shall be operated in a way minimising their resulting environmental impact in the framework of the present technical development and experience under economically and technically viable conditions – that means in compliance with BAT and BEP.

This is posing additional important pressure onto selected source categories (hazardous waste incineration, IPPC source categories etc.) to gradual implementation of BAT and BEP not only in new sources, where this requirement is already in place, but also in existing sources.

As problems are still considered:

- Transition period, needed to achieve compliance in existing sources,
- Definition , what is for the given activity considered as BAT and BEP
- Setting of concrete parameters for the respective activities

However, it is to stress that the requirement of BAT and BEP implementation itself represents an efficient tool to control all polluting substances, including POPs.

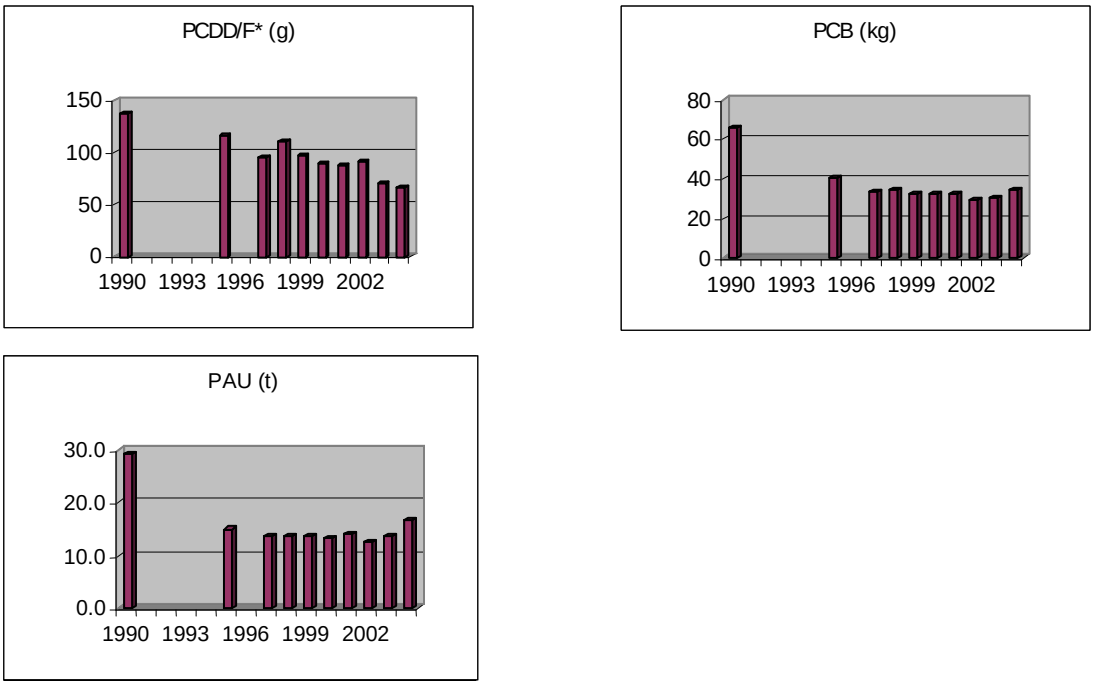
Besides the Slovak legislation concerning certain activities and processes also EU BAT reference documents, so called BREF are available. However, these documents are not specifically aiming at POPs controlling. A BAT overview from the POPs releases point of view is included in the technical annexes to the POPs Protocol.

Special problem are the POPs emissions resulting from uncontrolled burning and non-industrial processes. For this source categories implementation of BAT is not possible, therefore different tools such as involvement of public and an overall public awareness rising on POPs have to be applied.

**Evaluation of unintentionally produced POPs releases in the Slovak Republic**

POPs air emissions are evaluated according to the balance calculation from emission factors and volume of corresponding activity that is based on the methodology elaborated in the framework of the project "*Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)*". This method was updated for PCDD/PCDF in compliance with „Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases"(UNEP Chemicals, 2005) and additional available references. Measurements of unintended POPs emissions in the SR were unstable during years 1990 to 2004, while the first half of nineties certain decrease was recorder for all investigated POPs. The total emissions decrease in year 2004 in comparison with baseline year 1990 was by 51 % for PCDD/PCDF, 47 % for PCB, 42 % for PAH, 17 % for HCB. When estimating the PCB emissions, the releases from transformers and capacitors filling were not taken into consideration. The development of emissions of unintentionally produced POPs released to the air during years 1990 to 2004 is shown in figure 2.3.3/1.

**Fig. 2.3.3/1 – Development of unintended POPs emissions to the air during years 1990 - 2004**




**expressed as I-TEQ*

The most important source of PCDD/PCDF emissions in Slovakia is the metallurgical sector. The proportion of this sector on the total emissions was 45 % for PCDD/PCDF, 11 % for PCB, 5 % for HCB, 42 % for PAH in year 1990, and 56 % for PCDD/PCDF, 17 % for PCB, 18 % for HCB and 17 % for PAH in year 2004. Iron ore sintering and secondary iron and steel production contribute mostly to PCDD/PCDF emissions. Emissions of PAHs are generated predominantly during the coke and electrolytic aluminium production.
It is necessary to stress that this sector is one of the most important industrial branches in Slovakia and the volume of processed raw material and production produced are very high. Correspondingly, share of this sector in the total emissions is also high. During the monitored period, emissions of PCDD/PCDF decreased by 38% and PAHs emissions by 76 %. HCB emissions decreased by 57% and PCBs emissions by 15%. Production decrease comparing with the year 1990 caused this development, together with gradual implementation of environmental measures in the sector of iron and steel production. PAHs emissions decreased mainly due to reconstruction of aluminium production. Obsolete technology utilising anodes baked during the process has been replaced with an up-to-date technology utilising pre-backed anodes. Production volumes in this sector are quite steady in the last years and there is no reason to anticipate their decreasing in the future. Further decrease of emissions from this sector will be therefore possible only by consistent BAT/BEP implementation.

Dry process of dust elimination started in the coke deliveration from coke chambers started in year 2004. In the period 2001-2003, a broad reconstruction of the sintering units took place; consequently PCDD/PCDF emissions from ore sintering will therefore decrease by 30% under the same production volumes since 2003.

The waste incineration sector is second in order from the PCDD/PCDF emissions point of view. In the year 1990, this sector contributed to 38 % of total PCDD/PCDF emissions while in the year 2004 to 30 % of PCDD/PCDF emissions. Before 1990, incineration of industrial, communal as well as hospital waste was a relatively common waste management practice in

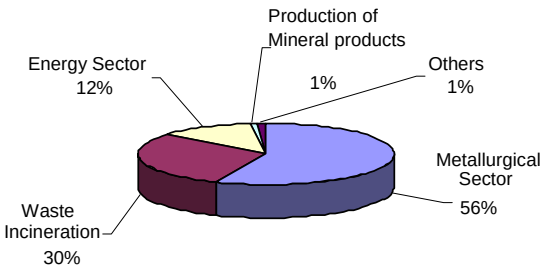
Slovakia. Due to adoption of new legislation in the waste management as well as air protection sectors, technical and technological requirements the waste incineration plants had to comply with got gradually in compliance wit those of the EU. Consequently, the number of waste incineration plants in Slovakia decreased remarkably. On the other hand, technical level of those remaining is gradually improving. Emissions from this sector reached their maximum in the year 1995, when a certain revival of the economy sector, connected with increased industrial waste production took place and the pressure of the new legislation still did not prove. All waste incineration plants will have to comply with the stringent BAT-based emission limits by 31 of December.

Third in order from the PCDD/PCDF emissions point of view is the power and heat production sector. In 1990 this sector contributed to 56 %, in the year 2004 up to 78 % of PAHs emissions and to 16% of PCDD/PCDF emissions in 2001, but 12 % in the year 2004. Within the energy sector, household heating and commercial sector heating are the main contributors to POPs emissions. This is mainly because unlike in the large public power plants, boilers in these sectors are not always operated under optimal conditions, and at the same time usually not equipped with any kind of end of pipe APC.

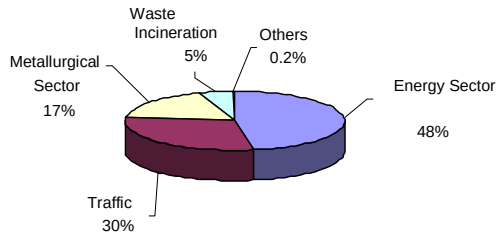
Proportion of the individual sectors to the total PCDD (PCDF, PCB, HCB and PAH emissions is shown in Fig. 2.3.3/2.

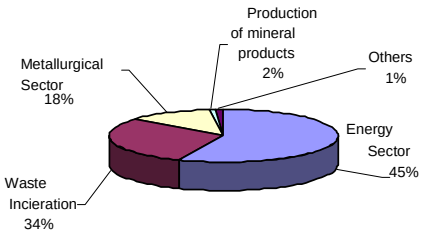
**Fig. 2.3.3/2 – Proportion of the individual sectors on the total emissions of PCDD/PCDF, PCB, HCB and PAH**

**Proportion of individual sectors on air emissions of PCDD/PCDF in 2004**

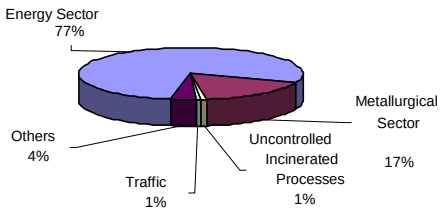



**Proportion of individual sectors on air emissions of**




**Proportion of individual sectors on air emissions of HCB in 2004**




**Proportion of individual sectors on air emissions of PAH in 2004**

Traffic emissions decreased since year 1990 by 11 % for PAHs, by 40 % for PCDD/PCDF (year 2004) despite of the gradually increasing number of vehicles and volume of road performance. This is due to progressing exchange of the vehicle park in favour of vehicles equipped with 3-way catalytic converter, as well as the steady decrease of leaded fuel use until its ultimate phase out in the year 1996. Contribution of traffic to overall PCDD/PCDF emissions is relatively low (0.2 %); and after recalculation of road traffic emissions by programme COPERT III it was shown that this sector is similarly insignificant for PAHs (1 %).

It may be assumed that POPs emissions do occur also in chemical production, particularly in processes utilising chlorine. However, there is not enough knowledge available at present to estimate these emissions. With regard to the relatively low production volumes, contribution of this sector to the total will be probably nil; however, from the local point of view these emissions should be not neglected. As evident from **Table No. 2.3.3/1**, more important problem in this sector is the PCDD/PCDF content in wastes and products. Since the year 1998, is one of the pulp producers utilising bleaching technology without elementary chlorine, through what the PCDD/PCDF content in the respective products decreased approximately by 90 %.

Uncontrolled combustion is further POPs emission source, for which emission estimation is a methodical problem; however, from POPs emissions point of view this sector may be an important environmental burden. Usually the incineration takes place under unfavourable conditions, and the incinerated substrate may be a mixture of various materials. Assessment of the amount of burned material represents the most important methodical problem.

**Tab. No: 2.3.3/1: Dioxin and furan emissions (g TEQ) to water, soil, products and wastes in the Slovak Republic in the year 2004*,**

| | Category | Air | Water* | Soil* | Products* | Wastes* |
|---|---|---|---|---|---|---|
| **1** | Waste incineration | 19,723 | 0 | 0 | 0 | 58,205 |
| **2** | Ferrous and non-ferrous metal production | 37,523 | $2,9E^{-07}$ | 0 | 0 | 19,177 |
| **3** | Power and heat generation, thermic processes | 8,137 | 0 | 0 | 0 | 0 |
| **4** | Production of mineral products | 0,488 | 0 | 0 | 0 | 0,010 |
| **5** | Transport | 0,167 | 0 | 0 | 0 | 0 |
| **6** | Uncontrolled combustion processes | 0,561 | 0 | 0,373 | 0 | 0 |
| **7** | Production and use of chemicals | 0,020 | 0,002 | 0 | 0,781 | 344,170 |
| **8** | Miscellaneous | 0,078 | 0 | 0 | 0 | 0,02 |
| **9** | Disposal / Landfills | 0 | 0 | 0 | 0 | 0 |
| | **Total** | 66,697 | 0,002 | **0,373** | **0,781** | **421,577** |

* Estimated in the framework of project "Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs), year 2001

**Identification of problems**

- Consistent enforcement of the environmental legislation
- BAT & BEP definition
- Uncontrolled combustion

- Chlorinated and halogenated chemical production
- Waste incineration
- Handling of wastes containing or potentially releasing POPs
- Pulp and paper technologies utilising chlorine and derivatives of chlorine as bleaching agent
- Secondary non-ferrous metals production

### 2.3.4 Stockpiles

**Introduction**

POPs stockpiles in the SR are dealt with the Act No. 127/2006 Coll. on POPs transposed the Regulation (EC) No. 850/2004 on POPs.

According to this act the holder of POPs is obliged on a yearly basis the type and amount of POPs stockpiles as of the ended year till 31 March to the Ministry of Environment or the designated body. The first announcement is to be delivered until 30 September 2006. Than the holder will record the stockpiles documentation per the individual types of contained POPs in order to keep the overview of stock receive, on approved handling and time of use, site of storage, their amount and way of disposal.

***POPs pesticides***

The appearance of obsolete POPs pesticides stockpiles is linked to the supported prices of pesticides in the former Czechoslovakia. Unlimited purchase for low prices by the former cooperative farms caused the generation of unwanted stocks. After the political change in 1989 the farms were reprivatised by former owners including the obsolete pesticides stocks. The most of these stocks are owned *de iure* by the former owners despite of fact that Czechoslovakia is the waste producer. The former owners did not recognise by the ownership change that the property contains also the obsolete pesticides. These stocks comprise also the obsolete pesticides that pose a human health and environmental risk when stored improperly.

***Polychlorinated biphenyls (PCBs)***

PCBs were produced in company Chemko Strážske since 1959 to 1984 under the basic product names Delor, Hydelor and Delotherm. More than 21 000 tonnes were produced totally.

PCB was used mostly for filling of capacitors produced in former Czechoslovakia, in company named ZEZ Žamberk, but also in paints and colours. It is presumed that after subtraction of exported amounts app. 7000 tonnes stayed in the territory of former Czechoslovakia.

***Hexachlorobenzene (HCB)***

HCB was used in the past mostly as selective fungicide and in agriculture for seed treatment before planting. HCB was directly used in industries for pyrotechnics production, marking missiles, aluminium smelting and its alloys production. HCB was also used for wood conservation, during carbon materials production, as soaking preparation in rubber industry.

Due to the fact that HCB is not produced in Europe any more, its concentrations in the environment significantly decreased during last 35 years.

**Stockholm Convention requirements**

According to Article 6 of the Stockholm Convention each party is obliged to ensure human health and environmental protection by means of:

i. acceptance of measures for decrease or elimination of POPs releases from stockpiles,
ii. preparation of appropriate strategies for investigation of stockpiles comprising and/or containing chemical substances listed in Annex A or B.

Stockpiles containing substances listed in Annex A or B, that are considered as an exception as described in Annex A or other special exception, or that are used for acceptable aims according to Annex B, are considered to be wastes and they can be exported only for purposes of disposal by an environmentally sound manner, and they should be handled in compliance with article 6 Para. 1. Letter d).

**Situation in the Slovak Republic**

***POPs pesticides***

POPs pesticide stockpiles are stored in Slovak territory mainly in the premises of the former agricultural farms and enterprises and they are still not reported to the appropriate state bodies as waste, despite of fact that in compliance with § 14 art. 11 Act No. 193/2005 Coll. on plant protection they become waste whenever they are not identifiable or when they are expired.

Paragraph 8 of Government Decree No. 531/2005 Coll., that pursue the requirements for introduction of plant protection preparations to the market defines that plant protection preparations containing active ingredients listed in Annex 8 (all POPs pesticides of Annex A and B - aldrine, DDT, dieldrine, endrine, heptachlor, hexachlorobenzene, chlordane, lindane, camphechlor and mirex) can not be introduced to the market nor used.
All POPs pesticides are also listed among substances subjected to PIC procedure and no import of POPs pesticides to Slovakia is recorded at present.
SR does not produce nor uses POPs pesticides, and many of them belong among substances with banned or severely restricted use.

**According to the results of investigation of obsolete plant protection preparation stockpiles** performed by CAITI (dept. of plant protection and phytoinspection) in years 2000 and 2002 from EU resources an estimate was performed as of **12 March 2003, resulting in identification of 98 % of all known plant preparation substances stockpiles in SR.** The detailed inventory description is presented in chapter 2.3.1 – Evaluation of POPs pesticides.

**Recent investigations in the framework of POPs pesticides inventory in SR shown 17 899.5 kg of POPs pesticides as of 15 February 2006.**

***Polychlorinated biphenyls (PCB)***

PCB stockpiles resulting from the past production (i.e. PCBs stored by users / holders, in pure status or as spare filling for capacitors) are probably mainly located in the premises of enterprises having PCB equipment („contaminated equipment“) still in operation.

In order to fulfil the obligation of decontamination or destruction of contaminated equipment till the end of year 2010 (as requested by Waste act) and gradually eliminate contaminated equipment from operation, the PCB holders are naturally interested in gradual destruction in compliance with the above act.

**According to the available data** (inventory of PCB equipment, 2001, other activities under project "*Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs"*, 2002, as well as ongoing inventory pursuant to Waste act) **no data on existing PCB stockpiles were reported**.

Despite of the reporting obligations of contaminated equipment holders according to the Waste act by means of filled record form (including in addition to the data specified in chapter 2.3.2 – Evaluation of PCBs – also reporting of any amount of spare filling stock containing PCBs and their concentration), the amount of PCB stockpiles in Slovak territory are not known.

It is necessary to emphasise that the inventory is still ongoing and Slovak Environmental Agency (CWEM) permanently updates the data on contaminated equipment reported from holders.

***Hexachlorobenzene (HCB)***

No direct stockpiles of HCB are expected in Slovakia due to stopped production in former Czechoslovakia in 1968 and banned use since 1985.

**Identification of problems**

Problem issues by the individual POPs type are as follows:

- finalisation of POPs pesticide stockpiles inventory in order to ensure timely their safe storage till their destruction, and environmentally sound destruction,
- finalisation of PCB stockpiles inventory (spare filling),
- safe storage and handling with PCB stocks till their delivery for destruction, and environmentally sound destruction,
- monitoring of legislative obligations fulfilment,
- public awareness increase and training of employees responsible for checking of obsolete POPs pesticides stocks in agricultural sector.

### 2.3.5 Waste

**Introduction**

POPs waste issues are regulated by Waste act where PCB holders, contaminated equipment and decontamination are defined. It also pursue the obligation to elaborate the programme of PCB holder, to issue the approval for destruction of used PCBs and decontamination of PCB contaminated equipment, to issue authorisation for reuse or disposal of waste oils (that can contain PCBs), it also regulates handling with PCBs and their recording. Moreover, Waste act regulates the responsibilities of governmental bodies and municipalities in the PCB waste issues.

Ministry of Environment Decree No. 135/2004 Coll. on equipment containing PCBs defines details on PCB decontamination, reference methods for identification of PCB content in decontaminated equipment, facilities, materials and liquids, as well as labelling of entrance to spaces where the contaminated equipment is located, labelling of decontaminated equipment and technical requirements for non-combustion destruction of PCBs.

The respective body (waste holder, facility for reuse or destruction of waste) is obliged to keep records and to report the waste to District Environmental Offices according to the actual legislation. The contaminated equipment holder is obliged to announce this fact to Ministry of Environment or designated body (SEA – CWEM). The records of waste in SR are kept by means of Regional Waste Information System (RWIS) under responsibility of SEA – CWEM. RWIS data are sorted by the waste catalogue categories as stated by ME Decree No. 284/2001 Coll. and as amended later.

**Stockholm Convention requirements**

The parties of article 6 of the Stockholm Convention are obliged to take measures in order to decrease or eliminate releases from POPs wastes in order to ensure safe handling with wastes containing or polluted by chemicals listed in Annexes A, B and C and protecting human health and the environment.
In order to perform these duties each party will elaborate appropriate strategies for identification of amounts of wastes containing or polluted by chemicals listed in Annexes A, B and C and it will take appropriate measures ensuring that such wastes including products and goods becoming wastes will be:

i. collected, transported, stored and handled by an environmentally sound manner,
ii. disposed off in such manner that the content of POPs is destructed or irreversibly transformed having not the properties of POPS any more, or it is otherwise environmentally soundly destroyed whenever the destruction nor irreversible transformation are not preferred from environmental point of view, or when the content of POPs is low, taking into consideration the international rules, standards and directives including those which can be prepared in accordance to the article 2, as well as respective global and regional regime of dangerous waste handling,
iii. restricted to landfill that could lead to reuse, recycling, direct or other use of POPs,
iv. restricted to transport across international borders without compliance of appropriate international rules, standards and directives.

Conference of Parties will closely co-operate with respective organs of Basel Convention on transboundary movements of dangerous wastes and their disposal, among other in:

a. identification of destruction level or irreversible transformation necessary to insurance of status when the substance has not more the properties of POPs as listed in art. 1 of Stockholm Convention Annex after this process,
b. decision on the environmentally sound destruction method according to the above wording,
c. when applicable, in stipulation of concentrations of chemicals listed in Annexes A, B and C in order to define low content of POPs in compliance with art. 4, point (ii).

According to the Annex A, part II, each party will apply maximum efforts (in connection with elimination of PCBs in equipment till year 2025, but not later than 2028) toward

environmentally sound handling with liquid wastes and PCB contaminated equipment containing more than 0.005 % of PCBs, in compliance with section 1, article 6.
Each party is obliged to ensure that equipment containing PCBs will not be exported nor imported for other purposes as environmentally sound handling with waste.

**Situation in the Slovak Republic**

***Polychlorinated biphenyls***

a) Production of PCB containing waste

According to the waste catalogue (ME Decree No. 284/2001 Coll. as amended later) PCB containing waste can be marked by catalogue numbers listed in the following table 2.3.5/1

**Tab. 2.3.5/1 – PCB containing waste according to waste catalogue**

| Catalogue number | Waste name | Waste category |
|---|---|---|
| 13 01 01 | Hydraulic oils containing PCB | N |
| 13 03 01 | Insulation oils or oils containing PCBs | N |
| 16 01 09 | Parts containing PCBs | N |
| 16 02 09 | Transformers and capacitors containing PCBs | N |
| 16 02 10 | End-of-use equipment containing or polluted by PCB, other than listed in 16 02 09 | N |
| 17 09 02 | Waste from constructions and demolitions containing PCBs (e.g. sealing materials containing PCBs, resin based floor cloths containing PCBs, insulation glass works containing PCBs, capacitors containing PCBs) | N |

As reported on waste production (source: RISO, SEA – CWEM) for years 2002 – 2004, the tendency of decreased amounts of PCB containing waste is obvious (tab. No. 2.3.5/2)

**Tab. 2.3.5/2 – Total amount of produced PCB containing waste in SR during years 2002 – 2004 (source: RISO, SEA – CWEM)**

| Year | Waste amount (tonnes) |
|---|---|
| 2002 | 286,862 |
| 2003 | 149,989 |
| 2004 | 124,804 |

b) Handling with PCB containing waste

Handling with PCB containing waste is regulated by legislation. According to the Waste act it is forbidden to landfill such waste. Tab. 2.3.5/3 shows the waste amounts according to the handling type in the individual years in Slovak territory.

**Tab. 2.3.5/3 – PCB containing waste amounts according to the handling type (tonnes) (source: RISO, SEA – CWEM)**

| Handling | | Year | | |
|---|---|---|---|---|
| | | 2002 | 2003 | 2004 |
| D1 | Land burial or land surface placement (e.g. land filling) | 0,02 | 0 | 2,228 |
| D5 | Waste landfills specially developed (e.g. placement into | 8,22 | 0,32 | 127,032 |

| | | | | |
|---|---|---|---|---|
| | separate cells with surface finishing, covered and insulated from each other and from the surrounding environment etc.) | | | |
| D9 | Physic-chemical treatment unspecified in this annex, giving compounds or mixtures destructed by one of activities D1 to D12 (e.g. evaporation, drying, calcinations etc.) | 7,582 | 6,744 | 12,854 |
| D10 | Incineration on mainland | 6,81 | 1,185 | 35,816 |
| D15 | Storage before use of certain activities from D1 to D14 (except of temporary disposal before collection at appearance site) | 6,832 | 12,834 | 27,619 |
| O | Delivery to other organisation for further treatment or appraisal | 4,418 | 119,577 | 29,701 |
| R1 | Exploitation mainly as fuel or for other energy production | 0 | 1,458 | 2,0 |
| R2 | Regeneration of solvents | 0 | 0 | 0 |
| R4 | Recycling or regeneration of metals and metal compounds | 0 | 0,17 | 1,034 |
| R8 | Regeneration of components from catalytic converters | 0 | 0,7 | 4,535 |
| R9 | Purification of oil or its other reuse | 33,25 | 3,47 | 0,43 |
| R13 | Storage of waste before application of some activity among R1 to R12 (except of temporary disposal before collection at appearance site) | 201,69 | 3,225 | 8,5887 |
| Z | Collection of waste (temporary disposal of waste before further handling at the appearance site) | 0,04 | 0,306 | 0 |
| **Total** | | **268,862** | **149,9890** | **128,804** |

c) Facilities for PCB containing waste treatment

An approval of appropriate state administration organs is needed in order to handle PCB containing waste. The conditions for incineration of PCB containing waste are fulfilled by waste incinerator of company Fecupral, a. s. in Veľký Šariš (Prešov district) with capacity of approximately 1 000 tonnes of incinerated waste per year. Companies Ecorec Slovakia and V.O.D.S. Košice have received the approval for PCB containing waste processing. Ecorec by method R1 and V.O.D.S. by method R4. Company Dekonta Bratislava has the approval for destruction of PCB containing waste by method D9.

***POPs containing pesticides***

a) Production of waste containing POPs pesticides

As the waste records in SR are based on the waste catalogue (ME decree No. 284/2001 Coll. as amended later), a precise identification of POPs pesticide containing waste is not possible. This waste could be comprised in wastes with catalogue number 02 01 08 – agrochemical wastes containing dangerous substances (N). Total amounts of agrochemical wastes containing dangerous substances produced in Slovak territory during years 2002 to 2004 are shown in tab. 2.3.5/4. However, it is necessary to mention that it is not completely clear whether these wastes contain some of substances listed in Stockholm Convention annexes.

**Tab. 2.3.5/4 – Production of agrochemical waste containing dangerous substances (02 01 08) in SR during years 2002 – 2004 (source: RISO, SEA – CWEM)**

| **Year** | **Amount of waste (tonnes)** |
|---|---|
| 2002 | 15.5640 |
| 2003 | 57.5811 |
| 2004 | 28.6212 |

b) Handling waste containing POPs pesticides

Agrochemical waste containing dangerous substances (02 01 08) that can also contain POPs are most frequently disposed on the dangerous waste landfills. Handling possibilities are listed in Tab. 2.3.5/5.

**Tab. 2.3.5/5 Amounts of agrochemical wastes containing dangerous chemicals (02 01 08) according to their handling (tonnes) (source: RWIS, SEA– CWEM)**

| Handling | | Year | | |
|---|---|---|---|---|
| | | **2002** | **2003** | **2004** |
| D1 | Land burial or land surface placement (e.g. land filling) | 6,0800 | 3,3300 | 7,4500 |
| D5 | Waste landfills specially developed (e.g. placement into separate cells with surface finishing, covered and insulated from each other and from the surrounding environment etc.) | 0 | 0 | 0,4200 |
| D9 | Physic-chemical treatment unspecified in this annex, giving compounds or mixtures destructed by one of activities D1 to D12 (e.g. evaporation, drying, calcinations etc.) | 0,0020 | 4,0600 | 0,5780 |
| D10 | Incineration on mainland | 0,1900 | 0,7100 | 2,4160 |
| D15 | Storage before application of certain activities from D1 to D14 (except of temporary disposal before collection at appearance site) | 8,5520 | 9,5100 | 6,5590 |
| O | Delivery to other organisation for further treatment or appraisal | 0,3000 | 37,2451 | 7,5950 |
| R1 | Exploitation mainly as fuel or for other energy production | 0,4350 | 0,1360 | 0,0050 |
| R2 | Regeneration of solvents | 0 | 0,2100 | 0 |
| R13 | Storage of waste before application of some activities from R1 to R12 (except of temporary disposal before collection at appearance site) | 0 | 1,6800 | 0,3100 |
| Z | Collection of waste (temporary disposal of waste before further handling at the appearance site) | 0,0050 | 0,7000 | 3,2882 |
| **Total** | | **15,5640** | **57,5811** | **28,6212** |

c) Facilities for handling POPs pesticides containing wastes

Agrochemical wastes containing dangerous wastes (02 01 08) can be disposed to the following dangerous waste landfills in operation:

1. A.S.A. Slovensko, s. r. o. Zohor
2. Istrochem Budmerice
3. Borina EKOS, s. r. o. Livinské Opatovce - Chudá Lehota
4. Mondi Business Paper SCP, a. s. Partizánska Ľupča
5. Tatranská odpadová spoločnosť, s. r. o. Žakovce
6. V.O.D.S. Košice – Myslava
7. ZSNP, a. s. Žiar nad Hronom

Agrochemicals waste containing dangerous substances are recovered by company Ecorec Slovensko, s. r. o. that produces an alternative fuel for cement factory Holcim, a. s. Rohožník.

**Problem identification**

The most important problems in the sector of wastes containing POPs are as follows:

- absence of technology for PCB containing waste destruction,
- public disagreement with incineration destruction methods for PCB containing waste, mostly among the NGOs,

- absence of option to identify pesticide wastes containing POPs, as it is not possible to assign them a unique catalogue number according to the existing Waste Catalogue,

- similarly, it is not possible to identify other POPs containing wastes, e.g. wood protection preparations or the residues of HCB in ammunition.

### 2.3.6 Contaminated sites

**Introduction**

Occurrence of POPs in the natural environment and in polluted areas or in different areas in general is a function of technological development of the country and its past production infrastructure. In the past, POPs and their effects on human health and environment were not yet sufficiently known and therefore, no effective regulation for their production, spread, use and liquidation existed.

**Stockholm Convention requirements**

Obligations relevant to contaminated areas are listed in part 1.2 of the Convention. Stockholm Convention requires that all parties develop their own strategy for identification of areas contaminated by POPs compounds listed in Annexes A, B or C. Moreover, if remediation of these areas is planned, this should be carried out in an environmentally appropriate manner.

**Situation in the Slovak Republic**

The most significant group of pollutants contaminating areas in Slovak Republic and classified among chemical compounds called POPs are polychlorinated biphenyls (PCBs). This conclusion is not surprising with regard to the history of production and distribution in Slovakia and it is supported by large amount of data in published research and by current monitoring in PCB-polluted areas, or by investigations performed recently. On the basis of above facts, PCBs are located in SR in two different types characterised by their origin as well as performance of the pollutant, polluted area size and known environmental impacts.

**1. The most significant site (or more precisely, region) polluted by POPs is the surrounding of former producer of these compounds, Chemko Strážske, which had produced PCBs for almost 25 years.**

PCB occurrence in the Strážske area (located in the eastern of Slovakia, Michalovce district) is caused by its production in Chemko Strážske during the period 1959 – 1984. Current contamination demonstrations come from the plant itself as well as from releasing PCB from the contaminated soil in the plant and its surrounding and from the waste PCB dumps. This contamination currently manifests itself also in broader area of these sources also because of the pollutant transport through wastewater channel to Laborec River and Zemplínska Šírava. The investigation of selected sites is irregular, discontinuous, the identification of development tendency of contamination is lacking – that could interfere with the evaluation conclusions regarding the pollution of Strážske region.

**2. An important group of PCB-contaminated areas are sites of former asphalt mixing plants.**

Bitumen mixtures coating plants are equipment for coating of different gravel fractions by bitumen. Bitumen is heated in double-cup containers with the heat-bearing medium (between the layers) is PCBs-containing oil (Delotherm DH, or Delotherm DK). It is estimated that approximately 600 tons of Delotherm DH and DK had been used for this activity.

Bitumen coated mixtures has been used (and are still used) for strengthening of the dusty roads or for building of the new roads or their reparation.

Measurement in sites[1] of former bitumen mixtures coating plants yielded following PCBs concentrations in the soil[2] of individual localities:

| | | |
|---|---|---|
| Ľubiša | 53 000 | mg. $kg^{-1}$ |
| Vechec | 7,5 | mg.$kg^{-1}$ |
| Zbudza (Žabany) | 0,043 | mg.$kg^{-1}$ |
| Zemplínska Široká | 0,052 | mg.$kg^{-1}$ |
| Stropkov | 38 | mg.$kg^{-1}$ |
| Mníchova Lehota | 35 | mg.$kg^{-1}$ |
| Smolenice | 0,7 | mg.$kg^{-1}$ |

In addition to the above listed sites[3], other 64 sites were identified in the SR where the asphalt mixing plants were or still are placed and they represent potential or proved area pollution. Number of sites and foreseen volumes of contaminated soil according to the SR regions are shown in Tab. 2.3.6/1 and Fig. 2.3.6/1, as well as Tab. 2.3.6/2 and Fig. 2.3.6/2. These tables show that the highest number of such sites was found in regions Prešov, Banská Bystrica, Košice and Trenčín. The foreseen volumes of polluted soils correspond to these numbers per region. Total number of identified sites is 68 (past and present) with estimated polluted soil volume reaching 60 400. Moreover, other high number of contaminated building constructions or out-of-use technologies for asphalt mixing.

**Tab. 2.3.6/1 – Number of asphalt mixing plants in the SR and its regions**

| Region | No. of plants | No. of polluted plant areas | No. of non-polluted plant areas |
|---|---|---|---|
| **1 Bratislava** | 7 | 5 | 2 |
| **2 Trenčín** | 11 | 10 | 1 |

[1] Details information is available in the study „Environmental and human population burden in area contaminated by PCB“, Kočan et al., 1999

[2] The following HPVs of PCB in soil are requested in SR (Official Journal MP SR, volume 26, unit 1/1994 Coll.):

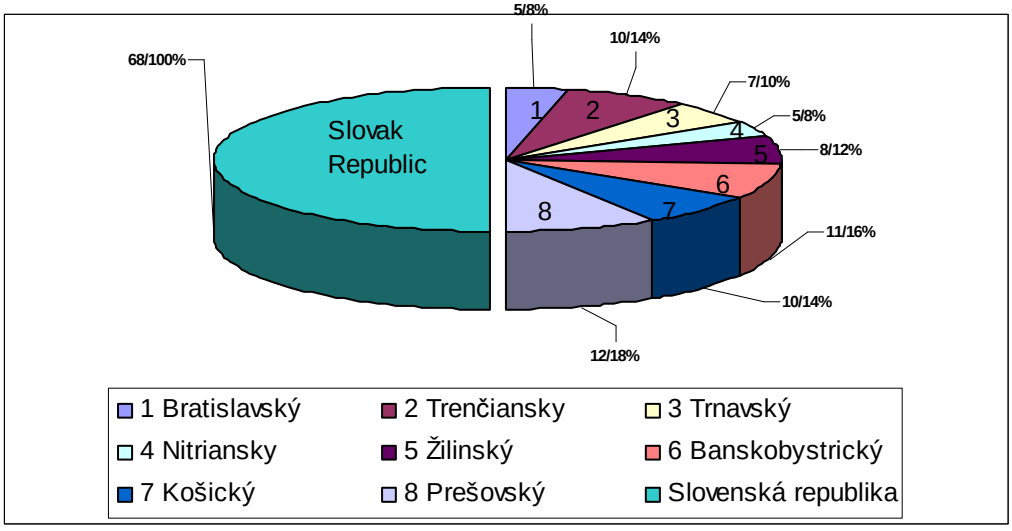
| | |
|---|---|
| 0,1 mg. $kg^{-1}$ | reference concentration of contamination for each indicative congeners (28, 52, 101,153, 180). Soil with concentration of PCB below this concentration is not considered as contaminated. |
| 1,0 mg. $kg^{-1}$ | indicative concentration of contamination. It is necessary to perform other studies and control of contaminated area in case the surface area and concentration can cause negative effect on human health or other compounds of the environment. |
| 10 mg. $kg^{-1}$ | indicative concentration of rehabilitation. Immediately make finally analytical survey for determination of extent of damage of controlled area and to purpose the measures. |

[3] Surface area of specific sides is app. 3 000 $m^2$ and more (see details in the study „Research of areas with POPs – PCB – asphalt mixing plants– in SR – Technical Report No. 4 of project SLO/01/G31)

| | | | |
|---|---|---|---|
| **3 Trnava** | 7 | 7 | 0 |
| **4 Nitra** | 5 | 5 | 0 |
| **5 Žilina** | 8 | 8 | 0 |
| **6 Banská Bystrica** | 11 | 11 | 0 |
| **7 Košice** | 10 | 10 | 0 |
| **8 Prešov** | 12 | 12 | 0 |
| **SR** | 71 | 68 | 3 |

Each site (area) was recorded by means of record form describing natural conditions (landscape, geology, hydrogeology), surface, distance to water recipient, living or industrial areas, present area exploitation, pollution extent, contaminant distribution (presence of natural barriers), distance to close national parks, protected areas, water protection areas, as well as polluted soil volume. The record also tracks „engineering"of the area in order to facilitate future investigation and remediation activities (accessibility, energy sources availability)[4].

**Fig. 2.3.6/1 – Number of polluted sites of asphalt mixing plants in SR and its regions and their proportion in %.**

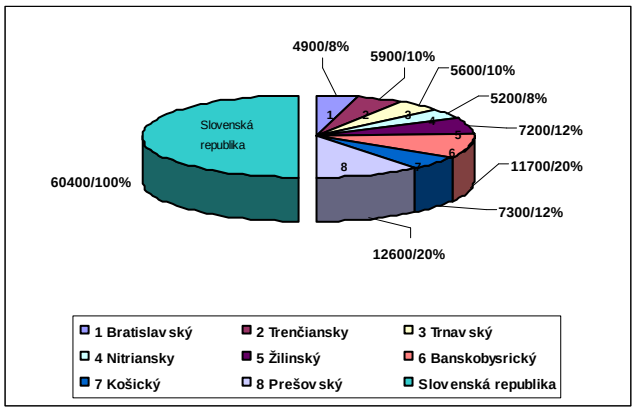



**Tab. No. 2.3.6/2 – Volume of polluted soil in asphalt mixing plant sites in SR regions**

| Region | Volume of polluted soil (m3) | Proportion (%) per region |
|---|---|---|
| **1 Bratislava** | 4900 | 8 |
| **2 Trenčín** | 5900 | 10 |
| **3 Trnava** | 5600 | 10 |
| **4 Nitra** | 5200 | 8 |
| **5 Žilina** | 7200 | 12 |
| **6 Banská Bystrica** | 11700 | 20 |
| **7 Košice** | 7300 | 12 |
| **8 Prešov** | 12600 | 20 |
| **SR** | 60400 | |

[4] Performed research present the first phase (in specific cases also 1. phase of the research) of contaminated area in accordance with recommended access to these areas (Guidance on Planning and Developing National Implementation Plans Under the Stockholm Convention (UNEP),Guidance – Set 6 POPs Contaminated Sites Survey and Action Plan.) – "A Federal Approach to Contaminated Sites" – CSMWG Canada – see details chapter 3.1.1 (i).

**Fig. 2.3.6/2: Volume of polluted soil in asphalt mixing plants in SR regions and their proportion in %**




Other localities with POPs occurrence were identified only by rare samples from different elements of the environment and are recorded in Technical Report No. 2. So far, we classify them as non-specific occurrence justified by 'emergency' disposal with individual POPs.

**Assessment criteria of sides contaminated PCBs**

**1. Strážske area**

This area has been more than 20 years regularly (and also irregularly) monitored on PCBs occurrence in all elements of the environment including biota and human population. The results of this monitoring contain several hundreds of PCBs-content analyses in all monitored 'commodities[5]'.
These analyses[6] lead consistently to conclusions that the monitored 'commodity' exceeds or highly exceeds health (ecological) limits. They describe the source of contamination (former PCBs production plant Chemko Strážske n.p.) with its technology, waste dump, drain away channel and Laborec river and Zemplínska Šírava.

The level of contamination of this area can be documented by the following:

- 20 times higher PCBs concentration in the ambient air around the former PCBs production plant in Strážske in localities Strážske and Voľa, and on the plant waste dump site, than in the control area.

- Sediment quality in Zemplínska Šírava water dam was investigated during three years by WRI (1997 - 1999) in the frame of state research and development project. WRI turned back to this issue later in 2003 when adjusting methods for sediment handling and in relation to investigation of selected specific pollutants required by supplementary monitoring of surface water and sediment quality. The emphasis was given to sediments of site Strážske (Laborec – Krivošťany, Laborec – Petrovce and Strážsky channel) in 2004.

The results of this investigation shown that sediments of water dam Zemplínska Šírava are heavily polluted by PCB, in particular of Delor group (Delor-103 and Delor-106) as well as

[5] soil, water, air, biota include human organisms
[6] „Environmental and human population burden in area contaminated by PCBs", Kočan et al., 1999

PCB congeners. Their concentrations reached the magnitude of thousands μg/kg. Sediments of Strážsky channel are very important when compared with Zemplínska Šírava regarding PCB concentrations. PCB in Strážsky channel are present in concentrations higher by an order of magnitude (tens thousands of μg/kg). These results confirm also other authors to full extent, as they measured similar or higher concentrations of PCBs in this channel.
A special focus is to be paid to results of sediment analyses originated from the waste channel from WWTP outlet to river Laborec nearby village Voľa that were obtained during investigations dated 1999 (heavy metals and PCB). In spite of fact that the wastewaters were redirected via sludge trap Poša to river Ondava during last several years, much higher concentrations of heavy metals and PCB were found in the channel than in Zemplínska Šírava dam itself.
Organic substances occurrence in the dam sediments points out to the important PCB pollution, particularly by Delor and PCB congeners. The parallel investigations shown that the inlet areas of Zemplínska Šírava dam (downstream industrial agglomeration Strážske) historical burdens are present that could additionally release PCB to the dam sediments.
When evaluating anthropogenic activities in the Zemplínska Šírava dam basin, the sediment quality is primarily noteworthy, as they represent a memory of past activities in the basin. They are able to absorb the contaminants from waters in their surface. On the other hand, this capability makes them a potential source of further (secondary) pollution of surface waters. Thus, sediment monitoring for PCB presence should be preferred instead of water column investigations. This statement is supported by physic-chemical characteristics of PCB molecules as confirmed by the recent WRI study (2004) *Mobility of substances accumulated in waster sediments.* PCB congeners behaviour in the process of leaching and mobility when they are accumulated in sediments (site Laborec-Petrovce and Strážsky channel) on the interface sediment / water shown very weak (to none) desorption from sediment to water column.

- Contamination of different elements of the environment was clearly manifested by findings of increased PCBs content in wild animals (fish, game animals). Especially the fish caught in contaminated waters of Zemplínska Šírava a Laborec contain on average 100 times higher PCBs levels compared to fish from the control areas of Domaša and Ondava. The situation with domestically bred animals is analogous that have free coop and feed contaminated forage from the adjacent areas.

- Higher PCBs content in some types of foodstuff available in polluted Michalovce district inevitable had to lead to higher PCBs contents also in inhabitants of this district. This was measured by PCB concentration in the lipids isolated from the blood serum. Inhabitants of Michalovce district have this concentration more than 3 times higher than the inhabitants of control district Stropkov. By the workers directly exposed during the PCBs production, this content was more than 7 times higher than in control district.

- Measured PCBs concentration in the soil of one of the Chemko Strážske waste dumps was several hundred times higher than in the control area.

On the basis of the above this district is considered as the most critical among the described sites and it may be marked as accidental in the sites of pollution sources.

**2. Areas of former asphalt mixing plants in whole territory of Slovakia.**

Former asphalt mixing plants comprise 68 sites appeared around Slovak territory. They are characterised as local pollution sources of the broader areas according to the level of

contamination, distribution media (flood waters) and vicinity of "vulnerable environment" (domiciles, protected landscape areas, protected water management areas, national parks), as well as recent exploration of the area[7]. 15 sites were listed among the first category areas that mostly endanger "the environment" and that require the "most urgent" remediation. The other sites are listed under second category where the remediation is necessary in the later phase.

**Identificacion of problems**

Based upon current results from polluted areas inventory and their monitoring we identify following problems:

- **Ecological exploration of the areas identified by inventory.**

As there is insufficient relevant data on scope of pollution in individual areas, there are some uncertainties in quantification and further steps necessary for their remediation.

Quantity of expected polluted areas (larger area of Strážske and 68 asphalt mixing plants) and estimated cost of exploration, there are following problems:

**a.** strategy for performance of the exploration activities
**b.** exploration methodology
**c.** unified analytical methodology of PCB detection in the matrix
**d.** securing of exploration capacities
**e.** co-operation with local specialised self-government
**f.** execution of exploration activities
**g.** monitoring of areas with identified PCB presence

- **Strategy of remediation of contaminated areas**

With regard to results of ecological exploration:

a. prioritisation of the areas for decontamination
b. technical and economic aspects of remediation in individual areas

- **Execution of remediation activities**

Following the results of addressing the issues described above, we identify following problems:

a. financial backing of remediation activities
b. technical and technological procedures for individual areas
c. co-operation with local governments
d. co-operation with organisations of III. sector
e. co-operation with the media

According to the recent inventory data (identification) of contaminated sites, the highest attention is to be paid to the following:

- **Establishment of a management and co-ordination body for performance of remediation and recultivation activities**

Exploration and land sanitation are activities that clearly follow one after another. Evaluation of the results of individual examination stages with various exploration techniques, or of the land sanitation together with quantities of administrative and legal activities and a variety of sanitation operations, requires co-ordination of these activities by a public body that is

[7] A lot of their is used for economic reason (various plants, storages, on - going production of asphalt mixtures) with the permanent service personal

familiar with the NIP issues and objectives. In addition, representatives of the organiszations that are most affected by the problem with contaminated area should be a part of this body. It would be local public administration representatives, affected landowners together with local government representatives of III. Sector.

It follows from the above that co-ordination of the tasks for the contaminated area will be assigned to a responsible body (group) which will partially consist of members that carry out this work during entire period and partially of members accredited by this work only for their areas (local public administration, local NGOs and affected local land owners).

Permanent members of the headquarters would be:
- ME SR representative - chairman
- ME SR representative (SHMI Bratislava as realisation institution)
  - 1. Vice-chairman, (executive)
- MEcon SR representative -2. Vice-chairman
- MA SR representative – member
- NGO representative - observer

Non-permanent members of the headquarters depending on their relationship to individual addressed contaminated areas would be:
- VÚC representative – 3. Vice-chairman
- Representative of the specialised local public administration (environment) - member
- Local government representative - member
- Representative of the affected area land owner - member
- Local NGOs representative - member

### 2.3.7 Identification and assessment of chemicals with POPs characteristics

**Introduction**

Persistent organic pollutants represent an important national as well as international problem in order to ensure human health and environmental protection due to their toxic properties, resistance against degradation and bioaccumulation, long range transport.
Since SR membership in EU, SR accepted the obligations resulting from EU legislation. In compliance with article 3 Regulation (EC) No. 850/2004 on POPs, implemented in the national legislation, SR is obliged in the framework of assessment and authorisation (registration) schemes on plant protection preparations according to the relevant Community legislation, to assess dangerous properties of pesticides e.g. persistence, bioaccumulation, long range transport potential via environment and other evidence of negative impacts to human health and the environment.

**Regarding the plant protection preparation issues,** the relevant Community legislation (Council Directive 91/414/EEC concerning the placing of plant protection preparations on the market, Council Directive 97/57/EC implementing Annex VI of Council Directive 91/414/EEC pursuing introduction of plant protection preparations to the market, for assessment of plant protection preparations is transposed by Ministry of Economy order No. 3322/3/2001-100 that sets out details on plant protection preparations, in particular in its Annex 15. SR acceded by this step the harmonised approach for assessment and authorisation (registration) of plant protection preparations.

This Directive sets out the harmonised principles for assessment and registration of plant protection preparations containing only the active ingredients listed in Annex I Council Directive 91/414/EEC on introduction of plant protection preparations to the market. Annex I of this Directive does not list only those active ingredients that do not have any negative impact to human health or animals or ground water, nor do they have an unacceptable impact to the environment.

**In the field of new industrial chemicals,** SR implemented harmonised risk assessment system for

- existing chemicals to human health and the environment by Council Regulation (EEC) 793/93 on risk assessment and risk management of existing chemicals,
- new chemicals to human health and the environment by Commission Directive 93/67/EEC pursuant to Council Directive 67/548/EEC (as implemented in the national legislation by Act No. 163/2001 Coll. on chemical substances and preparations as amended by later acts (hereinafter as „Act No. 163/2001 Coll.")),

into Ministry of Economy order No. 511/2001 Coll. on risk assessment of existing and new chemicals for human life, human health and for the environment.

**Stockholm Convention requirements**

Convention parties of the Stockholm Convention are in compliance with art. 3 obliged to accept the following measures:

i. Each party having one or more regulation and assessment schemes for new pesticides or new industrial chemicals will accept measures in order to avoid production and use of new pesticides or new industrial chemicals which – taking into consideration the criteria pursuant to par. 1 of Annex D – exhibit properties of POPs.
ii. Each party having one or more regulation and assessment schemes for new pesticides or new industrial chemicals will consider, when appropriate, for the assessment of presently used pesticides or industrial chemicals in the framework of these schemes the criteria pursuant to par. 1 of Annex D.

Annex D of the Stockholm Convention defines criteria for identification of dangerous properties of POPs as follows:

**Persistence:**

- Decomposition halftime of chemical in water is longer than 2 months or decomposition halftime in soil is longer than 6 months or decomposition halftime in sediments is longer than 6 months, or
- the substance is otherwise sufficiently persistent in order to consider its incorporation into the extent of this Convention.

**Bioaccumulation:**

- bioconcentration factor or bioaccumulation factor in aquatic species is higher than 5 000, or in case of lack of data log Kow is higher than 5
- other properties such as high bioaccumulation in other species, high toxicity or ecotoxicity, or
- monitoring data in biota signalise that bioaccumulation potential is sufficient for consideration of its incorporation into the extent of this Convention.

**Potential for long range environmental transport**:

- potentially significant levels of chemical in areas distant from the release of this substance,
- monitoring data showing potential for long range transport via air, water or migratory species, or
- fate properties of the chemical in the environment and/or model data proving the long range transport potential in the environment via air, water or migratory species. The decomposition time in air for the chemical that is transported by air to an important extent must be longer than 2 days.

**Negative influences:**

- to human health or the environment that entitle to consideration of its incorporation into the extent of this Convention,
- data on toxicity or ecotoxicity indicating a potential of deterioration of human health or the environment.

The assessment is aimed in evaluation whether the chemical substance may possess important negative impacts to human health or the environment due to its long range environmental transport which should result in a global activity. Risk profile will be elaborated and further developed for this purpose that will further process and assess the information according to the Annex D.

**Situation in the Slovak Republic**

Classification compliant with the Chemical Act is important for identification and assessment of chemical substances.

According to this Act, the legal entity introducing a chemical listed in the European Index of Existing Commercial Chemical Substances (EINECS) and not listed in the overview of dangerous chemicals is obliged to receive all accessible data on the substance properties in order to classify it.

Legal entity introducing dangerous chemical classified according to the Chemical Act, that:

1) is not listed among dangerous chemicals is obliged to preliminary classify this substance according to the available data, to label it by warning symbols, as well as safety phrases for the safe use,
2) is listed among dangerous substances is obliged to classify this substance and to label it as defined in this list.

According to the above Act the legal entity is obliged for each dangerous chemical substance and each dangerous chemical preparation introduced by him to the market to elaborate a safety data sheet that he will to Toxicology Information Centre and also to each receiver of the dangerous chemical or dangerous chemical preparation, except of the user, in an appropriate time period before the first delivery, not later that in parallel with the first delivery in order to allow the receiver to take effective measures regarding protection of human lives and health and protection of the environment.

POPs substances are not produced nor used in SR at present. Mechanisms for application (not application) of POPs plant protection preparations in SR are ensured in the framework of control performed by phytoinspectors of CAITI in compliance with Plant Protection Act.

According to the Act 193/2005 Coll. on plant protection, only those plant protection preparations can be placed on the Slovak market that were registered by CAITI, and they can be used to the extent and by means defined in the registration certificate issued by CAITI.

Registration is possible only for plant protection preparations that contain active ingredients listed or still not listed in Annex I of Council Directive 91/414/EEC, and these plant protection preparations may not in parallel have:

a) harmful effect to human, animal health nor the groundwater,

b) no unacceptable environmental impact.

Active ingredients and plant protection preparations nor other preparations for research and development purposes are not subject of registration.

Interlink between implementation of corresponding Community legislation (Council Directive 91/414/EEC on introduction of plant protection preparations to the market, Council Directive 97/57/EC pursuing the Annex VI of Council Directive 91/414/EEC) and Regulation (EC) No. 850/2004 on POPs is clarified at present, e.g. in the case of on-going assessment of active ingredient trifluralin according to Commission Regulation 451/2000/EC pursuing detailed rules for performance of the second and the third level of work programme as defined in art. 8 par. 2 of Council Directive 91/414/EEC.
Due to the SR membership in the EU, SR by means of a representative member in the PBT (persistent bioaccumulative and toxic substances) Working Group under DG ENV co-operates in assessment of the above mentioned active ingredient trifluralin. According to the assessment results this substance corresponds to the criteria of persistence for soil, thus, it fulfils the criteria of Stockholm Convention. The further step comprise the possibility of one of Convention parties to address the proposal for investigation of this active ingredient in the frame of Revision Council of the Stockholm Convention and to propose its enlistment to the Annex I. It is necessary to clarify at this level the further procedure of active ingredient trifluralin, first of all whether the assessment according to the Council Directive 91/414/EEC is to be continued.

In the case of assessment of dangerous properties of chemicals having also POPs characteristics according to the Annex D of the Stockholm Convention, SR due to its membership to EU will ensure via the competent authority (Centre for Chemical Compounds and Preparations, CCCP), in co-operation with authorised institutions of Ministry of Environment and Ministry of Health risk assessment of new chemicals for human health and the environment compliant with Commission Directive 93/67/EEC in accordance with Council Directive 67/548/EEC, as implemented into national legislation by Chemical Act.
Slovak Environmental Agency – Centre for Waste and Environmental Management Bratislava (SEA CWEM) is an authorised body of Ministry of Environment. Human health risk assessment is performed by authorised body – Regional Authority for Public Health Banská Bystrica (RAPH Banská Bystrica).
All new chemicals are subjected to risk assessment, i.e. substances that were introduced to EC market after year 1981. When introducing to Slovak market substance in amount between 1 - 10 tonnes per year or 50 tonnes in total, the substance is subjected to assessment of PBT characteristics (persistence, bioaccumulation and toxicity) according to PBT criteria assessment set out in Technical Guidance Document on Risk Assessment (TGD, 2003):

| Criteria | PBT criteria | vPvB criteria |
|---|---|---|
| Persistence | - halftime in sea water > 60 days or<br>- halftime in freshwater > 40 days or<br>- halftime in sea sediment > 180 days or<br><br>- halftime in river sediment > 120 days | - halftime in sea water or freshwater > 60 days or<br>- halftime in sea or river sediment >180 days |
| Bioaccumulation | - bioconcentration factor in aquatic species >2,000 | - bioconcentration factor in aquatic species > 5,000 |
| Toxicity | NOEC < 0.01 mg/l or CMR or having endocrine disruptor effect | Not applicable |

PBT criteria are assessed individually in the order persistence → bioaccumulation → toxicity and it is based on the performed tests compliant to OECD Guideline for Testing of Chemicals. New chemicals are in principal considered as PBT only when all three criteria are met (P, B and T). PBT assessment according to criteria set out in TGD is discussed in the framework of criteria addressed by the Stockholm Convention.

Two new chemicals were assessed according to Commission Directive 93/67/EEC in SR until 2005, only one of them met criteria of TGD (2003) according to PBT evaluation and only one of them met criteria of vPvB.

Results of inventory of chemicals that were introduced to SR market performed by CChSP during years 1999, 2000 and 2001 shown that none of POPs substances as listed in Annexes A and B of the Stockholm Convention were present.

In the EU countries a new chemical legislation REACH should come into force since 2007 that is in the implementation preparatory phase. The Commission proposes that existing and new chemicals will comply in the future (following the step-wise implementation till 2012) to the same procedure according to **unified system**. Thus, REACH will finalise the theoretical historical border between new and existing chemicals. In the framework of REACH requirements all chemicals introduced to the EC market in the amount higher than 10 tonnes per year will be subject of registration. In accordance with the European Parliament and Council regulation proposal on registration, evaluation, authorisation and limitation of chemicals, chemical safety will be assessed and Chemical Safety Report will be elaborated when the registration produces or imports such substance.

Chemicals under increased attention will require authorisation for a particular use pattern via European Commission: chemical substances like CMRs (mutagenic, carcinogenic substances and reproduction disruptors), PBTs (persistent, bioaccumulative and toxic), vPvBs (very persistent and very bioaccumulative) and those substances marked as having serious and irreversible effects to human health and the environment. Authorisation is aimed in good operation of internal market and in parallel in ensure proper risk management resulting from respectable substances, and also in a long term perspective of replacement of such substances by acceptable substitutes or technologies when economically and technically feasible.

**Identification of problems**

Problematic issues in relation to identification and assessment of POPs chemicals can be defined as follows:

- elaboration of measures for control of production of new pesticides or new industrial

chemicals,
- implementation of an effective mechanism for submission of information on production and use of new industrial chemicals and phase-out of POPs or similar chemicals in SR,
- definition of format for information submission on production and use of new industrial chemicals towards the National Contact Point for POPs in SR.

### 2.3.8 POPs monitoring

The obligation to undertake monitoring of the persistent organic compounds (POPs) group is directly specified in both Stockholm Convention and Regulation (EC) 850/2004 on POPs which modifies Directive 79/117/ES. However, neither of these norms specifies the way, how the POPs should be monitored. In the Convention, there is general statement that monitoring programs should be methodologically harmonised by different parties to the Convention and should be carried out in extent appropriate to possibilities of a given party to the Convention.

The obligation of monitoring of 12 compounds defined by the Convention (aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene, PCB, DDT, PCDD/PCDF,) is enlarged by proposal of the Regulation for further four compounds listed in POPs protocol to CTRLTAP (chlordecone, hexabromobiphenyl, HCH including lindane, poly-aromatic hydrocarbons). The subject of monitoring should be content levels of these compounds in human organism and in elements of the environment.

**Requirements of the Stockholm Convention and Regulation (EC) 850/2004 on POPs**

Stockholm Convention defines in its article 11 requirements for monitoring as follows:

1. The parties shall, within their capabilities, at the national and international levels, encourage and/or undertake appropriate research, development, monitoring and co-operation pertaining to persistent organic pollutants and, where relevant, to their alternatives and to candidate persistent organic pollutants, including on their:

   (a) sources and releases into the environment
   (b) presence, levels and trends in humans and the environment
   (c) environmental transport, fate and transformation
   (d) effects on human health and the environment
   (f) release reduction and/or elimination
   (g) harmonised methodologies for making inventories of generating sources and analytical techniques for the measurement of releases.

2. In undertaking action under paragraph 1, the parties shall, within their capabilities:

   (a) support and further develop, as appropriate, international programs, networks and organisations aimed at defining, conducting, assessing and financing research, data collection and monitoring, taking into account the need to minimise duplication of effort;
   (b) support national and international efforts to strengthen national scientific and technical research capabilities, particularly in developing countries and

countries with economies in transition, and promote access to, and the exchange of, data and analyses;

(c) take into account the concerns and needs, particularly in the field of financial and technical resources, of developing countries and countries with economies in transition and co-operate in improving their capability to participate in the efforts referred to in subparagraphs (a) and (b)

(d) undertake research work geared towards alleviating the effects of persistent organic pollutants on reproductive health;

(e) make the results of their research, development and monitoring activities referred to in this paragraph accessible to the public on a timely and regular basis;

(f) Encourage and/or undertake co-operation with regard to storage and maintenance of information generated from research, development and monitoring.

Article 16 than further states:

1. 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, the Conference shall evaluate the effectiveness of this Convention.

2. 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:

   (a) should be implemented by the parties on a regional basis when appropriate, in accordance with their technical and financial capabilities, using existing monitoring programs and mechanisms to the extent possible and promoting harmonisation of approaches

   (b) may be supplemented where necessary, taking into account the differences between regions and their capabilities to implement monitoring activities

   (c) 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.

3. The evaluation described in paragraph 1 shall be conducted on the basis of available scientific, environmental, technical and economic information, including:

   (a) reports and other monitoring information provided pursuant to paragraph 2

   (b) national reports submitted pursuant to Article 15

   (c) Non-compliance information provided pursuant to the procedures established under Article 17.

In Annex D the Convention further defines the obligation to submit evidence of bio-accumulation potential of any chemical compound that should be included in the list of chemical compounds in Annex A, B, or C. This evidence should be based on biota monitoring.

Regulation (EC) 850/2004 on POPs defines in the article 9 the requirements for monitoring as

follows:
The Commission and the member states will create in close co-operation appropriate programmes and mechanisms that will comply with the present status in order to submit comparable monitoring data on dioxins, furans and PCBs presence in the environment. When introducing such programmes and mechanisms the development according to CRLTAP POPs Protocol to the Stockholm Convention will be considered.

**Situation in the Slovak Republic**

There is no monitoring program focused specifically on POPs in Slovakia. Despite this, POPs are monitored in practically all elements of the environment and living organisms including humans, as well as in foodstuff, but in an uncoordinated manner.

None of the individual currently realised monitoring programs comprehensively covers whole area of Slovakia.

Evaluation of spatial distribution of individual POPs can be carried out on regional level by combination of results of monitoring by several institutions. In case of PCB, HCB and DDT this is monitored in water and farm animals, Heptachlor is only monitored in water. The data basis is insufficient for planar evaluation of other parameters and matrices. The results of supplementing monitoring that was carried out as a part of project Initial help for Slovakia in fulfilment of obligations following from Stockholm Convention; indicate that pollution of the environment by POPs pesticides does not constitute a problem for Slovakia.

Highest level of POPs content was detected in human population. Relatively high POPs levels were recorded also by farm animals. From the elements of the environment, highest level of POPs concentration was observed in soils. However, very high POPs contents were locally documented also in sediments.

Valuable information on POPs amounts produced in the selected sites, their environmental transport, fate and transformation are available from monitoring of WWTP sludge. An important proportion of POPs produced in certain area terminates the air transport due to dry or wet deposition on the earth surface, then it is flushed by precipitation via sewage systems into municipal WWTP. Due to the lipophilic character of these substances they are concentrated in WWTP sludge during the treatment process. This allows to summarise (but also alternatively to monitor) POPs production in the area. Only one targeted investigation in selected WWTPs was performed for PCDD/F in Slovakia, while PAH concentrations are monitored since 1998 – but not for whole SR territory.
The up-to-date sludge monitoring results from POPs point of view show that additional activities linked to art. 6 of Regulation (EC) 850/2004 on POPs are necessary – EU member states should monitor the releases of enlisted POPs into the air, water and soil.

The monitoring programs indicate that there is trend of decreasing POPs occurrence in all monitored matrices, where available data allow for time series analysis.

**Identification of problems**

Priority problem in the area of monitoring is the insufficient communication between the institutions methodologically co-ordinating and executing the partial monitoring programs. To

achieve higher effectiveness of POPs occurrence evaluation in different matrices, following problem areas will have to be addressed:

- Focus of POPs monitoring on their potential sources and final recipients
- Co-ordination of POPs measurement in individual monitoring programs and their methodological direction
- Co-ordination of presentation of the measurement results
- Insufficient data base about the occurrence of PCDD/PCDF in all monitoring matrices
- Insufficient data on POPs occurrence in the air
- Lack of data on POPs occurrence in forest soils

Solving of these problem areas can be transformed into the following measures:

1. Establishment of a POPs monitoring working group
2. Processing of a methodology for unified system of POPs monitoring on national level
3. Securing execution and co-ordination of monitoring according to a plan prepared on national level
4. Analysis of the methodologies and securing co-ordination of laboratories for use of sufficiently precise and selective analytical methods
5. Securing the information flow between institutions responsible for monitoring and the institution/s responsible for reporting
6. Making the monitoring results accessible to expert and general public in sufficiently intelligible form
7. Supporting the research in areas related to design and operation of monitoring on national and international level

### 2.3.9 Identification of influenced inhabitants or environment compartments

**Introduction**

Identification of exposed inhabitants is closely linked to the properties of these chemicals, their resistance to degradation in physical, chemical as well as biological processes (low degradability) and toxicity. Via the environmental compartments they can be transported to long distances from the site of production, thus, they pose a high risk of health impairment also in areas far distant from the sites of use or emission. However, the risk of damage is similar or higher in the source site. The health risk results also from the potential of these substances to bioaccumulate in adipose tissues of living organisms including humans to the amounts that are able to harm. They could also be contained in the fat cells of mother milk, increasing the health risk for infants.

**Stockholm Convention requirements**

Stockholm Convention emphasises strongly not only environmental quality, but also human health protection. According to the Convention:

- being suspect of human health risk resulting from local exposure to POPs, mostly to women and the future generations through women ,

- having in mind Decision of Environmental Programme Executive Board UN 19/13 C dated 7 February 1997 on initiation of international activity for human health protection through measures that will decrease and/or eliminate the emissions and releases of POPs.

Convention parties:

- being aware of necessity to implement preventive measures in order to avoid harmful effects of POPs in each step of their life cycle,
- being decided to protect human health and the environment against harmful effects of POPs.

Human health and environmental protection are one of priority objectives of this Convention. Such activities are therefore embodied in nearly each Convention article:

- art. 3 – „Measures for decrease or elimination of releases from intended production and use", point 2.b) – the importer is obliged to protect human health end the environment by adoption of appropriate measures in order to minimise or prevention of releases,
- art. 3, point 6 – each party who received a special exception will apply appropriate measures in order to ensure that any production or use according to this exception will be performed by means that prevent or minimise human exposure to these substances.

According to art. 5 that includes „Measures for decrease or elimination of releases from unintended production" each party will adopt measures for decrease of total amount of each chemical listed in Annex C and released from anthropogenic sources in order to permanently minimise, and if applicable, to eliminate them.

Art. 6 states „Measures for decrease or elimination of releases from stockpiles and wastes" and obligation for Convention parties to handle the stockpiles comprising chemicals or containing chemicals listed in Annex A or B, and wastes including products and goods that will become waste comprising chemicals or being polluted by chemicals listed in Annex A, B or C, by means protecting human health and the environment.

Human health issues are also mentioned in articles 8, 9, 10 – in relation to information, education and public awareness.

According to the Art. 11 the parties will perform appropriate research, development and monitoring to an extent feasible for them, as well as co-operation including activities related to:

- health and environmental impacts,
- research towards decreased POPs influence to reproduction health.

Section II. solving PCB, DDT each party will support measures for decreased exposure and risks in order to limit the use of these substances.

**Situation in the Slovak Republic**

Stockholm Convention on POPs indirectly defines in the individual articles the exposed groups of inhabitants that require increased attention. First, employees of enterprises who are directly exposed to these substances during intended or unintended production and during handling of contaminated equipment or products. Second, broad citizens exposed by contaminated environmental compartments.

Evaluation of environmental contamination and human population in SR by POPs in given time section was the main purpose of monitoring performed in the framework of the project

"*Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs"*. The direct aim of this project was to submit detailed analysis of state-of-the-art in all environmental compartments and human population based on existing monitoring data in SR, and to elaborate monitoring proposal for the future.
Management and monitoring of health protection are dealt by multiple ministries, e.g. health, environment, agriculture, economy, each of them having its own competence.

Evaluation of data from individual monitoring activities in SR allowed defining representative groups of inhabitants that will be paid special attention, in relation to measures for population health protection. Identical population subgroup was identified by the individual monitoring matrices for particular POPs type. As the projects were focused on the most polluted areas, they do not give a precise picture on the spatial population exposure. When identifying priority groups exposed to POPs, the knowledge gained from monitoring and inventories was explored.

The highest POPs exposure potential group was identified among employees being in direct contact with those substances. As these substances (PCBs) were produced in Chemko Strážske in the period 1959 – 1984, Chemko employees belong to the most exposed group. The risk for these employees results not only from intended production in the past, but first of all from present unintended production when released from polluted area and PCB stockpiles. Employees directly exposed in PCB production units the concentration of PCB in blood serum fat reached 7 times higher values as in the control population from district Stropkov. Also other employees from different enterprises are in certain risk, mostly due to decontamination of equipment and waste containing POPs substances. Indoor environment of buildings also increases the risk, as the analyses of indoor air (monitoring of municipal waste incinerator) showed increased PCB concentrations.

Despite of more than 20 years of DDT application ban, it is still possible to prove its presence in the environment in parallel with its degradation products DDE and DDD. POPs pesticides represent an important factor of danger to ecosystems and human health. Despite of POPs pesticide pollution is not a priority problem in SR. Monitoring of *human population* showed increased concentration of these POPs mainly in *agricultural areas*. Population exposure to DDT showed the highest concentrations in Košice region. These data belonged to the highest when compared with published data in other countries. High concentrations – up to tens thousands of ng/kg were detected in the elderly people. Also phytoinspectors could be included among high risk group as they are in contact with these substances during their activities when checking the stockpiles.

Inventory of contaminated areas by POPs allowed identifying the most polluted and the most endangered sites in SR, as well as the biggest population in risk – inhabitants living in contaminated areas. The sites contaminated by POPs substances represent areas with long-term negative effect to human health related to the gradual release of these substances to the environment - sites where pollution source is production or other equipment, asphalt mixing plants, incineration plants and sludge beds. Citizens living in surrounding areas to landfills or historical environmental burdens present the group in the highest risk at present, as these sites form a source of continuous POPs release to all environmental compartments. Waste, including waste containing POPs were mostly deposited in landfills without appropriate protection of the environment. The most endangered population in SR is formed by citizens of districts *Strážske and Michalovce* due to high load of environmental compartments thank to the former PCB production in Chemko. Monitoring results showed that PCB concentrations in blood serum fat

were 3 times higher in Michalovce district citizens than in control Stropkov population. Thank to transport potential of these substances also other inhabitants living close to the plant are in increased risk, moreover, population close to the waste channel including Zemplínska Šírava water dam and river Laborec – it means *district Zemplín inhabitants.* Region of Eastern Slovakia could be included among risk areas regarding PCB pollution. The inhabitants lining there are exposed to increased risk not only by contaminated environmental matrices, but also via direct ingestion of contaminated food produced by household. Fishermen consuming free living fish containing cumulated POPs including PCBs have increased levels of these substances in their bodies. The highest levels reached more than ng/kg of fat (the normal levels in EU citizens being in hundreds of ng/kg of fat).
The Stockholm Convention concentrates in its Annex C to POPs substances that are unintentionally produced and released by different anthropogenic sources – not only production itself, but also from so called household fireplaces. POPs substances emissions from non-industrial, or non-controlled incineration (e.g. household waste incineration, grass or garden waste burning) pose an increased risk mostly for rural population. Incineration obviously does not have appropriate conditions, and different types of wastes are burned – resulting in important load of POPs emissions for environment and also the above population. It will be therefore necessary to develop certain pressure to this group in order to change the behaviour in favour of minimised burden to the environment and themselves.

A vulnerable group among the exposed population is formed by children. The youngest children can be first of all negatively influenced by accumulated POPs in mother milk. Mother milk analyses showed that these substances were present in increased amounts, e.g. when compared with cow's milk. PCB concentrations in mother milk of certain areas of SR exceeded the usual values from industrial areas. As the lactation period lasts for several months, from the life span point of view it does not represent an important increase of intake. However, the investigations show that the levels decreases in younger population, also in their mother milk, and the nursed children are exposed to decreasing health risk.

Despite the finding of highest concentrations of these substances in humans and livestock (project "*Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs*)", there is also a positive finding that the burden to humans by these substances decreases. It is a result of abandoned production and use in opened systems, in particular result of limitation and ban of PCB, HCB and DDT use in SR. Emissions of unintentionally produced POPs had also decreasing tendency in SR during years 1990 to 2001.

Assessment of environmental compartment burden

POPs are substances that deteriorate environmental quality. These substances negatively influence all compartments – air, water and soil.

Air is considered as important matrix of transport to the other compartments (water, soil, sediment) and further to the food chain of animals and humans. Regular monitoring of POPs in the outdoor environment is not performed in SR. The most comprehensive measurements were done in the framework of PHARE project EU/93/AIR/22 during years 1996 to 1997. Slovak Health University (SHU) performed several single measurements under three research projects. Limited number of PCBs, dioxins and furans and selected pesticides (DDT/DDE and HCB) measurements was performed in air samples during second half of ninetieths. The average concentrations of DDE and DDT, as well as HCB and PCB reached several tenths to

hundredths of pg/$m^3$. The measured concentrations were comparable with European countries in the period of sampling. After evaluation of outdoor air burden by POPs substances one can conclude that insufficient amount of data does not allow assessing whether the concentrations of these substances in the air decrease. The responsibility for outdoor air protection belongs under Ministry of Environment.

Water quality investigation in relation to the Stockholm Convention is performed by several institutions to different extent SHMI, OPH SR and ROPH, Water Works, WRI, Hydromeliorations Enterprise, SMS Bratislava, IPCM, VTÚ Liptovský Mikuláš). Aldrin, DDT, dieldrine, HCB, PCB analyses were performed in ground water, surface water, swimming water, wastewater as well as drinking water samples. Majority of analysed samples did not show exceeded limit values for investigated substances; only in few of them – sometimes only sporadically.
Environmental compartments showed the highest concentrations in soils. Agricultural soil investigations for inorganic and organic pollutants were done by CAITI in period 1991 – 2001. Targeted investigations of polluted soils were performed by IPCM and State Veterinary and Food Institutes. 5150 analyses of different types of soil samples to dieldrine, endrine, and heptachlor, DDT, PCB and HCB were performed during years 1986 and 2001. The results show that endrine, dieldrine and HCB are present in very low concentrations. Increased levels were measured in some sites in average for HCB, and the highest concentrations for DDT and PCB. Despite of finding of POPs soil levels decrease in time it is necessary to make additional efforts in order to decontaminate the soil in the most polluted areas.

Human population can be contaminated by POPs substances not only via environmental compartments, but mainly by contaminated food. The food is considered as most important contamination source of humans, as it comprise 95 % of intake. Food monitoring showed that average chronic population exposure dose to selected organic substances (PCB, aldrine, dieldrine, endrine, HCB, DDT) from foodstuffs did not reach related to unacceptable increased probability of consumer's health. Population exposure reached the highest level in PCB and HCB. The samples from household farming in contaminated areas.

On the basis of POPs monitoring results it is obvious that decreasing tendency of POPs prevails in all monitored matrices, i.e. the human health risk also declines.

**Identification of problems**

According to identification of exposed population one can define the following problems:

- Increased exposure risk of workers in contact with POPs
- Insufficient information of public on harmful properties of POPs.

Solution of these problems could be transformed into the following measures:

- Minimisation of risk of professional exposure for workers in contact with POPs
- Increase of public awareness on the level of environmental compartments and foodstuff contamination for groups living in the most polluted areas
- Increase broad public awareness on the harmful properties of POPs
- Propose and perform measures for rural populations emphasising the danger of non-regulated local incineration of household wastes
- Prepare and perform measures for decreased exposure of all identified citizen groups according to the importance of their hazard

- Broaden the investigations to greater sub-populations in order to increase the reliability of results

### 2.3.10 Raising of public awareness on POPs

**Introduction**

Public participation on addressing the POPs-related issues belongs to indirect tools for elimination of problems with persistent organic pollutants. It consists of two basic interconnected processes:

- sufficiency of information available to expert and general public – passive reception (information, education)
- public participation on implementation of measures – active participation (facilitation, voluntary tools)

It is not possible to expect active participation of public on POPs elimination without available and comprehensible information. This statement is valid for both, expert workers (e.g. in relation to elimination of PCB-containing equipment, including training of operating such equipment regarding the work safety) as well as general public (e.g. education relating to burning waste in domestic fire places).

**Stockholm Convention requirements**

Stockholm Convention puts significant emphasis on public participation and defines areas where public participation is recommended:

1. awareness raising among policy and decision makers
2. provision of information to the public
3. implementation of education programs aimed at specific target groups
4. public participation on solutions and on development of measures for implementation of the Convention provisions
5. training of workers, scientists, and technical and managerial personnel
6. development of educational materials
7. implementation of educational and training programs
8. making accessible the information on social and economic impacts of POPs elimination.

**Situation in the Slovak Republic**

Environmental education is one of possible ways how to satisfy Stockholm Convention requirements relating to work with public for securing public information, education and general awareness rising on POPs by target groups defined by the Convention. This environmental education does not constitute a specially codified or accentuated issue within the EU policies. EU policy is focused on education as such, its availability, quality, non-discrimination, co-operation, etc. This also means that it was not a priority during the SR and EC negotiations. Partially relevant issues are addressed in the chapters Environment and Consumer and Health Protection. It can be assumed that after ratification of the Convention, there will be increased attention paid to the issue of environmental education.

Basic documents on EU level that currently and indirectly address the issues of environmental education, awareness raising and public participation on environmental decision making, are: Aarhus Convention (AC), EP&C Directive 2003/4EC on public access to environmental information and on cancellation of the EC Directive No. 90/313/EHS (in force since 14 02 2005), and the Action Plan for the Environment and Constituting Contracts of the European Community. However, SR is not yet party to AC, so it is difficult to identify possible cumulative effect of the obligations relevant to securing of the information standard in Slovakia, be it on the environment in general or in specific area of POPs.

Measures for the accession are gradually implemented. On December 17, 2003, Slovak government passed a proposal of the Act on environment information gathering, keeping and disseminating. This Act will apart for the provisions of the first pillars of AC partially transpose also the EP&C Directive 2003/4/EC. The proposal of this law started a serious discussion on the information provision in Slovak Republic. Most of the important remarks represented disagreement with special mode of provision of environmental information in passive reception. Generally valid Act of NC SR No. 211/2000 Coll. on the freedom of information is according to opinions of most commentators sufficient and ME SR initiative is considered to be restrictive. As a result of commenting procedure, the passed proposal of the Act thus covers only area of gathering and keeping of the information, including basic provisions. Area of making the environmental information accessible is changed to dissemination of environmental information. In making the environmental information accessible, Act No. 211/2000 Coll. on the freedom of information will be the applicable law.

With respect to evaluation of the situation in the area of public rights pursuant to Article 10 of the Stockholm Convention, it is necessary to list some of the principles of Act 205/2004 Coll. from 12 March 2004 on gathering, keeping and dissemination of environmental information and amendment of certain other acts.
This act adopts the first pillar of Aarhus Convention and partially transposes the EP&C Directive 2003/4EC on public access to environmental information and on cancellation of the EC Directive No. 90/313/EHS. The proposal of this act deals with following:

a) There is a broad and precise definition of the term “environmental information” (including POPs, their effects, their handling, etc.);
b) It defines so-called obligatory subjects and their obligations, especially to:
    1. gather, keep and if necessary update environmental information relating to performing of their public functions; this should be done in a way that will best enable transparent and effective public access to the environmental information;
    2. disseminate environmental information that are at their disposition – this should be done with preference on public communication networks (especially the Internet);
c) It requires ME SR to keep and actualise so-called metadata catalogue, list of obligatory subjects with specification of types of environmental information that they keep,
d) It requires establishment and maintenance of the National Pollution Register, as a structured database based on obligatory periodic (yearly) reporting from the operators of relevant companies. Data on pollutants release and their transfer outside the source area will be in this register kept in a way that will allow search by:
    1. pollution source and its location,
    2. activity
    3. operator
    4. pollutant or waste
    5. element of environment into which the pollutant is released,

6. target of the pollutant or waste transfer outside the source are, or according to whether the aim is their disposal or recycling.

e) It deals with monitoring of:
   1. release of 86 chemicals into the air, water and soil – among them are all POPs from the Annexes A to C of the Stockholm Convention, as well as
   2. transfer of wastes (including POPs-polluted wastes) outside the plant, from the plants meeting the criteria in the Annex 2 of this Act and from diffuse sources, if release or transfer of pollutant or waste exceeds appropriate threshold values.

   This register is so-called PRTR (Pollutants Release and Transfer Register) in terms of Article 5, paragraph 9 of the Aarhus Convention. Its legal specification in the government proposal of the Act is fully compatible with the Protocol on pollutant release and transfer to the Aarhus Convention. This protocol was signed in Kiev in May 2003 – Slovakia is not a party to this protocol.

According to Stockholm Convention aims, public awareness on POPs represents a methodical procedure of making the information on POPs accessible to individual target groups. The content of this procedure will be complementary connected to the outputs of monitoring and reporting and information exchange systems. It reflects up to now non-existent unified monitoring and reporting system on chemicals in general; also the system of informing the public on POPs has a similar character.

Act on IPPC is closely linked to the above issues in parallel with ME SR Decree No. 391/2003 Coll. pursuing IPPC Act, as the **second pillar of Aarhus Convention is reflected there – „Public participation on the decision making process“**, as well as European Parliament and Council Directive No. 2003/35/EC. IPPC Act sets out the public participation on the decision making processes in compliance with this Directive.
IPPC Act was updated in 2005 by Act No. 532/2005, coming into force since 1 January 2006. Adoption and updating of the above acts SR makes another important step towards fulfilment of the obligations of Convention second pillar.

POPs issues are also dealt by Conference of Parties to the Basel Convention **on the transboundary movement of dangerous wastes and their disposal**. Basel Convention sets out control mechanisms of transboundary transport of dangerous wastes in order to protect human health and the environment against negative impacts of dangerous wastes.

Basel Convention Regional Centres were established (14 of them being operable in all UN regions) in order to facilitate implementation of the Convention in to national legislation, as well as to transfer environmentally sound technologies. All Centre activities follow 10 year BC Strategic Plan of the individual countries of Central and Eastern Europe that fall under Bratislava Centre. The Centre:

- elaborates biannual activity plan in compliance with the Strategic Plan for BC Implementation and the national interests of countries in the region,
- co-ordinates management of technical projects under responsibility of RCBC Bratislava,
- elaborates and organises training programmes and workshops in the field of environmentally sound dangerous waste handling, transfer of environmentally sound technologies in order to incorporate Basel Convention and its tools into national legislation,
- compiles, evaluates and spreads information on the dangerous and other wastes issues towards Convention Parties in the region and also BC Secretariat,

- implements and keeps regular information exchange on the BC requirements as well as creation of national and international network,

- co-operates with UN and it organs, UNEP and other expert organisations, intergovernmental institutions. industries in order to co-ordinate activities, development and implementation of common projects related to Basel Convention and insurance of synergies with other multilateral environmental conventions.

6th Conference of Parties to the Basel Convention agreed elaboration of guidelines oriented to environmentally sound handling of POPs. Working Group to the Basel Convention in co-operation with Stockholm Convention Secretariat initiated in 2003 works on elaboration of horizontal guideline for environmentally sound handling of waste comprising, containing or contaminated by POPs, as well as technical guideline for environmentally sound handling of waste comprising, containing or contaminated by PCB, PCT or PBB. Experts from many countries participated on their elaboration together with NGO representatives. In addition to an important function of both Conventions secretariats (Basel and Stockholm), also technical and scientific support from UNEP Chemicals played crucial role. Effective bilateral co-operation in order to reach a common tangible target resulted in both guidelines adopted by 7th COP to the Basel Convention.

Whenever the limit concentrations will be exceeded, the wastes will be regulated by corresponding statements of the Stockholm Convention on POPs. The guidelines also set out the procedures for environmentally sound handling of wastes comprising, containing or contaminated by POPs. Basel Convention Secretariat submitted technical guidelines for evaluation to the 1. Conference to the Stockholm Convention (COP 1) on POPs in May 2005. This is an issue of common interest to solve the issues in question, thus, continuation of co-operation is foresee, in the future.

An active co-operation between both conventions is ongoing also on the institutional level. Both, Basel and Stockholm Convention secretariat representatives participate on the regular co-ordination working meetings, they are involved in issuing journals and scientific articles, and they co-operate on management of joint projects. Regional Basel Convention Centres play an important role as co-ordinators of projects and organisers of workshops. They serve not only for implementation of the Basel Convention into the practice, but they also – when approved by Basel Convention Secretariat – temporarily offer their services to the activities according to the Stockholm Convention, when necessary.
It is proposed to manage the communication among the individual parties of Stockholm Convention on the same basis as it functions for the Basel Convention centres.

### 2.3.11 Relevant activities of NGOs

As the POPs issues are rather complicated, the risk they pose could be eliminated only in the collaboration of state initiatives with private sector and the activities of NGOs. Capacity building in order to manage POPs issues is necessary in each party.

NGOs play an important role in addressing the problems increasing the risk for human health and the environment. They focus their campaigns not only to disseminate of objective information and awareness raising in target groups, but they also initiate legislation development, approval processes in technologies and products introduction to the market, youth education and field activities.

Environmental civic movement comprises few decades of non-profit organisations that are oriented to environmental protection issues and linked status of civil society.

Multiple NGOs are active in the issues f POPs. They elaborate and issue information materials, organise protest meetings, education sources, training and conferences, they co-operate with different institutions, industrial and municipal representatives, international environmental organisations, they initiate and perform laboratory tests and evaluations.

The communication of Ministry of Environment with NGOs in the field of POPs management is ensured ad hoc, mutual agreements being the basis of the co-operation.

Co-operation Plan in the field of environmental protection is regularly adopted with ASPEK – Association of Industrial Ecology. Active co-operation comprises information dissemination on activities ensured by EU institutions in POPs related issues, as well as in the field of preparation of SR positions to the individual issues, e.g. concentration limits of POPs in wastes set out by EC.

Moreover, the co-operation on POPs management issues with Union of Chemical and Pharmaceutical Industry will result in a discussion on new POPs identification to be potentially incorporated to Stockholm Convention lists, e.g.: hexachlorobutadiene, octabromodiphenylether, pentachlorobenzene, polychlorinated naphtalenes, chlorinated paraphines, pentabromobiphenylether and decabromodiphenylether.

In the issues of preparation of EU concentration limit values for POPs content in wastes Ministry of Environment communicates with NGO „Priatelia Zeme – SPZ Košice“ (Friends of the Earth) in relation to disagreement of NGOs co-ordinated by IPEN (International POPs Elimination Network).

ME SR based on communication with NGOs and in compliance with recommendation of minister of environment SR voted against EC proposal on EC Committee for EC legislation adoption on waste to the scientific and technical development with regard to POPs on 25 January 2006, arguing that it is necessary to clarify extraordinary differences of values proposed by EC and NGOs.

It is necessary to strengthen the possibilities of NGOs to raise awareness on POPs issues on the level of target group – the community in risk, and to realise the important role NGOs could play in the health and environmental protection against dangerous chemicals and dangerous wastes.

### 2.3.12 Research and development

**Stockholm Convention requirements**

The Stockholm Convention defines for its parties responsibilities in the area of research and development, binding them to the following:

The parties shall, within their capabilities, at the national and international levels, encourage and/or undertake appropriate research, development, monitoring and co-operation pertaining

to persistent organic pollutants and, where relevant, to their alternatives and to candidate persistent organic pollutants, including on their:

(a) Sources and releases to the environment;
(b) Presence, levels and trends in humans and the environment;
(c) Environmental transport, fate and transformation;
(d) Effects on human health and the environment;
(e) Socio-economic and cultural impacts;
(f) Release reduction and/or elimination; and
(g) Harmonised methodologies for making inventories of generating sources and analytical techniques for the measurement of releases.

In undertaking these activities, the Parties shall, within their capabilities:

(a) support and further develop, as appropriate, international programs, networks and organisations aimed at defining, conducting, assessing and financing research, data collection and monitoring, taking into account the need to minimise duplication of effort;
(b) support national and international efforts to strengthen national scientific and technical research, capabilities, particularly in developing countries and countries with economies in transition, and to promote access to, and the exchange of, data and analyses;
© take into account the concerns and needs, particularly in the field of financial and technical resources, of developing countries and countries with economies in transition and co-operate in improving their capability to participate in the efforts referred to in subparagraphs (a) and (b);
(d) undertake research work geared towards alleviating the effects of persistent organic pollutants on reproductive health,
(e) make results of their research and development and monitoring activities referred to in this paragraph accessible to the public on a timely and regular basis;
(f) encourage and/or undertake co-operation with regard to storage and maintenance of information generated from research, development and monitoring.

## Situation in the Slovak Republic

### Overview of essential documents and decisive organizations that create institutional framework for support of research and development activities in SR

**Documents**

Act no. 172/2005 Coll. is a basic document on organisation of state support to research and development amending Act No. 575/2001 Coll. on organisation of Government performance and organisation of central state administration as amended later.

Information support of research and development is based on art. 26 section 2 of Act No. 172/2005 Coll. on organisation of state support to research and development. It ensures collection, processing and submitting of information on research and development financially supported by state budget. Ministry of Education manages this information system.

Government Commission for Science and Technology

It is an advisory and consultation body to the Slovak government, for preparation and implementation of state scientific and technical policy, based upon economic, social and

cultural development of Slovak Republic. It was created on the basis of art. 9 Act No. 172/2005 Coll. on organisation of state support to research and development and amendment of Act No. 575/2001 Coll. on organisation of government performance and organisation of central state administration as amended later.

Agency for Support of Science and Technology
The Agency was established on 1 July 2005 as a legal descendent of Agency for Support to Research and Technology in accordance with art. 12, Act No. 172/2005 Coll. in order to support research and development by financial means for projects.

Slovak Academy of Sciences (www.sav.sk)
Slovak Academy of Sciences (SAS) is a legal person established by the Act No. 133/2002 on the Slovak Academy of Sciences. SAS is a major Slovak scientific institution that contributes to development of science, education and general development of the society. The activities of the academy are mainly basic research in selected areas of natural, technical and social sciences, compliant to the state scientific and technical policy. The academy applies new scientific findings in applied research and economic and social practice, as well as in expert, advisory, scientifically-educational and culturally-educational activities.

**Research activities and projects – focused on POPs**

1. Physic-chemical and molecular- biological processes and their influence to food quality as a determining factor of SR population nutrition (Food Research Inst.),
2. Chlorinated aromatic substances in human organisms from selected model SR areas (Inst. of Preventive and Clinical Medicine - IPCM),
3. Biological monitoring of persistent chemicals and their impact to health of selected SR populations (Inst. of Preventive and Clinical Medicine - IPCM),
4. Polychlorinated dibenzo-p-dioxins, debenzofuranes, biphenyls and dioxin-like PCBs in the human population of the Slovak Republic: An analysis and health risk assessment (IPCM),
5. Appearance of selected toxic and carcinogenic organic and in organic substances in outdoor air of selected areas in SR (IPCM),
6. Local studies of air quality in the cities of Bratislava and Košice, national needs assessment of early signs of biological action following exposure to polyhalogenated dibenzo-p-dioxins and related substances (IPCM),
7. Xenobiotics as potential additive in allergy development (IPCM),
8. Environmental burden and human population in area contaminated by PCB (IPCM),
9. Projects „The 2nd round of the WHO-coordinated exposure study on the levels of PCBs, PCDDs and PCDFs in human milk“ and „The 3rd round of the WHO-coordinated exposure study on the levels of PCBs, PCDDs and PCDFs in human milk“ (IPCM),
10. Assessment of health risk resulting from long term exposure to low doses of PCB (EC project, 2000 – 2004),
11. Early development of child and PCB exposure in SR (USA project, 2002 – 2006).

Ministry of Education manages a database that contains RD projects financed or co-financed from state budget in SR since 1996. One of them, entitled „*Assessment of health risk after long term exposure to low doses of PCB*“ was co-ordinated by IPCM and Inst. of Experimental Endocrinology of Slovak Academy of Sciences was a co-author.
Another international projects under auspices of ME SR are linked to POPs issues, e.g. DG-ENV project “*Dioxin emissions in Candidate Countries*“, UNIDO/UNDP project *”Global*

*programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs), The Slovak Republic, First Phase"*. These projects can not be understood as basic research ones. However, their conclusions might be useful for formulation of further focusing of new research projects in the future.

As the Stockholm Convention came into force since 17 May 2004, RD projects dealing with POPs in SR are still not based on co-ordinated and planned grounds – they were not incorporated into state RD programmes. The application for RD projects will be improved just in the framework of this NIP; specification of necessary projects and identification of necessary financial resources will be elaborated in a separate document linked to the National Reference Strategic Framework for 2007 – 2013, as well as Lisbon Strategy till 2025.

Long- term research is concentrated to epidemiological projects investigating health impacts of POPs to human population in the area of former production – Eastern Slovakia, and they are financed by EU or UN. Projects focused on new types of POPs and assessment of POPs impacts to the environment are still absent.

In order to ensure certain development in the field of RD in SR also in POPs management issues, a co-operation with Slovak Technical University (STU) was established on the basis of Framework Co-operation Plan between ME SR and STU. STU solved a project of PCB remediation procedures, as well as PCB concentration decreasing technologies in 2004. The final reports are available on ME web page www.enviro.gov.sk where also broad public could find requested information.

A regular co-operation plan is agreed between ME SR and SAS, and it comprises information exchange on POPs destruction for year 2006. An intention to elaborate a database (web access) of relevant chemicals with description of their dangerous properties belongs to the initial activities.

The mutual co-operation in the POPs management issues is recently based on permanent consultations when elaborating SR positions to EC documents, as well as Stockholm Convention secretariat. ME SR declared a support to research and development in this field, in parallel with incorporation of RD activities into National Strategic Reference Framework (NSRF) for period 2007 – 2013. This basic document for receive of financial support from EU structural funds is under preparation at present.
The Stockholm Convention, art. 11 forms a basis for RD development, as it requests the parties to support and to perform appropriate research and development e.g. in POPs characterisation, their changes and irreversible transformation, decreased releases into the environment, replacement of POPs, transfer of POPs via environment, health and environmental impacts of POPs, methodology harmonisation for sampling and analytical control of POPs.
In relation to art. 8 of the Stockholm Convention a co-ordination is under preparation with POPs Assessment Committee established on COP-1 in order to co-ordinate activities for further involvement of additional chemicals among POPs, in compliance with requirements set in Annexes D and E of the Stockholm Convention .
According to the art. 9 of Regulation (EC) No. 850/2004 on POPs, appropriate programmes and mechanisms corresponding to the best available technologies will be elaborated – this is also a basis for research and development in POPs management issues. In relation to art. 6(2) of this Regulation, co-operation will be necessary also when elaborating the measures for

application of substitutes or modified materials, products and technologies in order to avoid appearance and releases of POPs into the environment.
As stated in art. 6(3) of this Regulation, the co-operation will be needed also during the proposal of alternative procedures and technologies.
The cooperation in the field of research and development is substantiated also in relation to the activities of IPPC Working Group - established in commonly by ME SR and Union of Industrial Associations in order to implement Act No. 245/2003 Coll. on IPPC, where relevant activities ensured by EU institutions form a basis.
As the problem issues are rather broad in this field, a task specification will be elaborated for the coming period. It will reflect that state obligations resulting from the relevant international agreements are quite serious. Moreover, a possibility to elaborate a special sub-programme of state research and development in relation to the art. 23, section 4 of Act No. 172/2005 Coll. on organisation of state support to RD is under consideration. As Ministry of Education is responsible for this Act, an initial discussion of relevant issues will be agreed between minister of environment and minister of education.

# 3. Strategies and Action Plans

## *3.1 Political Statements*

SR joined global international activities in the fields of human health and environmental protection in order to reduce negative impacts of persistent organic pollutants (POPs). SR is also a signatory of both basic international conventions on POPs management that are implemented into the national legal system.

Both documents were published in Collection of Acts SR and announced by Ministry of Foreign Affairs SR. The Protocol on POPs to Convention on long range transboundary air pollution was announced in No. 367, section 158/2003 Coll., the Stockholm Convention was announced in No. 593, section 254/2004 Coll.

Membership of SR to the EU forms a strong support to implementation of these conventions, as well as force of Regulation (EC) 850/2004 on POPs.

Slovak government confirmed the orientation of SR policy in compliance with international agreements obligations in POPs management issues, and this is also expressed by following government activities:

- Government Decree 1138 from 6 December 2001 approving „Integrated Approximation Strategy of SR for the Environment“, including Directive 96/59/EC on PCB destruction,
- Government Decree 180 from 27 February 2002 empowering ME SR to „co-ordinate implementation of measures in order to reach the targets of Waste Management Plans of SR till 2005“, solving also dangerous waste issues including POPs wastes,
- Government Decree 309 from 27 March 2002 empowering ME SR to „co-ordinate works on continuation of PCB equipment inventory and to create conditions for this inventory“,
- Government Decree 349 from 10 April 2002 empowering ME SR to „ensure enforcement of the Stockholm Convention since it will come into force“,
- elaboration of government proposal of POPs Act that was approved by Parliament and published under No. 127/2006 Coll.,
- support to UNIDO project “*Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs) and Demonstration of their Viability*“, that resulted in signature of the Project Document by UNIDO director general and minister of environment SR on 16 February 2006.

POPs management issues touch a broad range of sectors of national economy, thus, National Implementation Plan for Stockholm Convention will be also submitted to a session of government SR. Incorporation of POPs issues into National Strategic Reference Framework is under preparation, and this document elaborated by Ministry of Regional Development will serve as a basis for SR absorption of EU funds in period 2007 – 2013 by means of particular projects.

## *3.2 Implementation Strategy*

The ground basis for each environmental strategy in SR is formed by concluding document of UN Summit on Environment and Sustainable Development in Rio de Janeiro (1992) - AGENDA 21.
Strategic document for environment was elaborated in 1993 - „Strategy, principles and priorities of state environmental policy", that was approved by government decree 619/1993.
Among the most important related documents, National Environmental Action Plan is to be mentioned, approved by government decree 350/1996, and National Environmental Action Plan II, approved by government decree 1112/1999.
National Sustainable Development Strategy was elaborated in 2001 and it was approved by government decree 978/2001. Integrated Approximation Strategy for the Environment was developed as a supporting document and it was approved by government decree 1138 from 6 December 2001.
Waste Management Programme of SR till 2005 should be mentioned in relation to partial POPs issues, it was approved by government decree 180 from 27 February 2002. This document solves also dangerous waste including POPs waste.
GEF project *Initial Assistance to the Slovak Republic to Meet its Obligations Under the Stockholm Convention on Persistent Organic Pollutants (POPs)* in period of 2003 to 2004 resulted in elaboration of National Implementation Plan for the Stockholm Convention. Draft NIP was elaborated and it included proposals for action plans for POPs pesticides, PCB containing equipment, unintentionally produced POPs, contaminated areas and releases from storage of stockpiles and wastes, monitoring, reporting and information exchange, public awareness raise, institutional and legislative measures, research and development orientation to POPs replacing products. These proposals formed a basis for this plan.

Government of SR accepted Strategy of Competitiveness of SR till 2010 in February 2005, and in relation to Lisbon process also National Lisbon Strategy is under preparation, as well as National Programme of Reforms. Environmental pollution reduction, environmental quality increase in regions, protection against dangerous environmental burdens, enforcement of environmentally sound products and public awareness raising belong to the environmental policy priorities – the same as the recommended measures of Stockholm Convention on POPs.

Action Plan for Sustainable Development in SR for the period 2006 – 2010 is under preparation during year 2006. It will comprise also elaboration of database of international agreements and documents with emphasis to obligations of SR and evaluation of their performance in the past, in order to implement them into long-term strategic documents and economical policy of SR. Industrial Policy of SR, Energy Policy of SR and Raw Material Policy of SR will form a basis for POPs management issues, as the state aid will be concentrated to meet the complex targets of horizontal character in the fields like environmental protection, research and development, with special attention to specific characteristics of individual regions, facilitating also meeting the obligations of Stockholm Convention.
POPs issues were also incorporated into the National Strategic Reference Framework for EU programming period 2007 – 2013, opening a possibility to absorb supporting resources for financing of activities in order to improve POPs management.

## *3.3 Activities, Strategies and Action Plans*

Based on the accessible actual information in the field of research, monitoring and exchange information in accordance with European Commission recommended framework of its documents No. ENV/C.3/D (2005) from January 30 2005 considering the Stockholm Convention the following chapters has been developed.

### 3.3.1 (a) Activity: Elimination of unintentional production and use of POPs

**Setting of priorities**

Based on the assessment of results of the POPs inventory and on the overview about the status of current technologies used in Slovakia, with respect to BAT; considering the Stockholm Convention provisions as well as the agreed priority setting criteria, following action plan measures are proposed:

**1. To consistently enforce the requirement of operating certain activities in compliance with BAT & BEP for new sources and gradual implementation of BAT & BEP in existing sources (See also Action plan: Institutional and legal measures)**

**2. To set up a framework for monitoring and mitigation of total releases of chlorine or other halogens containing pollution (target based management of pollution sources)**

**3. To reach compliance in the pulp bleaching technology, based on molecular chlorine, with IPPC BAT requirements within the period of ten years**

**4. To eliminate uncontrolled thermal destruction of organic coatings from recycled raw materials for secondary metal production; to promote non-thermal mechanic de-coating methods**

**a. Require BAT implementation**

**b. Consider this measure also in the Waste Management Program**

**c. Support the measure via the Recycling Fund**

**5. To modify current reporting methods and means concerning waste production, air emissions, wastewater production as well as consumption and use of hazardous substances, in order to optimize their monitoring and to ensure:**

**a.. effective monitoring of unintentionally produced POPs**

**b. reporting obligations of Slovakia**

**At the same time, amend the Act No 245/2003 Coll. on Integrated Pollution Prevention and control as well as the enforcement documents with regard to possible POPs releases**

**6. To develop and implement an education, training and course system, dedicated to employees working at various levels of the relevant sectors.**

**7. To develop a project to assess the amount of unintentionally produced POPs, generated by waste-wood incineration and to appraise the seriousness of this problem in Slovakia**

**8. To promote non-oxidative processes and BAT for destruction of wastes containing POPs and for destruction of wastes containing chlorine**

**9. To promote research in the following areas:**

**a. Alternative technologies to produce chemicals, which are currently produced by technologies based on chlorine, and/or radicals of chorine, or other halogen substances**

**b. Identification an definition of BAT for the particular sectors/technologies**

The proposed priorities are elaborated in more detail in the following text. Each chapter ends with a table containing the proposed activities (column 1) in order to meet the requested outputs (column 2) the assumed timeframe (column 3), proposed institution/body responsible for the implementation (column 4) and a reference to further details and annexes of the NIP (column 5).

## Proposed measures

### *1. To enforce consistently the requirements for operating with BAT & BEP for new sources and gradual implementation of BAT & BEP in existing sources*

For certain source categories this requirement is already in force. It is already in place for all new sources of selected source categories. For selected existing sources, a so-called transition period is established. From POPs releases reduction point of view, greatest emphases to implement BAT and BEP is in the sectors of ferrous and non-ferrous metallurgy and in the sectors of waste incineration and co-incineration, where more than 90% of PCDD/PCDF air emissions are generated; as well as in the pulp and paper industry and chemical industry, where the majority of unintended POPs by products is generated, which is polluting other components of environment. Promotion of research in the area of BAT definition is subject to the measure No 9.

Based on the situation analysis of current state of technologies used in Slovakia, with regards to BAT may be stated, that in the primary iron and steel industry remarkable environmental investments took place in the recent years and consequently, the technologies used will comply with BAT by the year 2004. Similarly, the electrolytic aluminium production complies with BAT since the reconstruction in 1995. The secondary production of iron and color metals is subject to the measure No 4.

Similarly, the process industry – production of chemicals, pulp and paper, building materials, etc. already made remarkable environmental investments, or is in the process of doing so. Technology exchange is triggered not only by the pressure of new environmental legislation (they are falling under IPPC Directive), but also by the effort of maintaining competitiveness.

In the waste incineration sector at present only 18 of the currently existing waste incineration plants meets the stringent emission limits for waste incineration; three of them are under reconstruction. All waste incinerating or co-incinerating plants shall comply with the emission limits, including the emission limit for PCDD/PCDF (0,1 ng TEQ /$m^3$), by 31 12 2006, or they will have to cease their operation.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***1.*** | ***To enforce consistently the requirements of operating of new and existing sources in compliance with BAT & BEP*** | | | | |
| 1.1 | Emission limits for waste incineration | | ongoing | ME SR | Included in the current legislation. |

***2. To set up a framework for monitoring and mitigation of total releases of chlorine or other halogens containing pollution***
*(target based management of pollution sources)*

Chemical as well as pulp and paper industry are main sources of pollution which is being released into more components of environment.
Except for chlorine ions, we may assume that any other chlorine content in wastes or products may potentially lead to further unintended POPs releases (from land filled or incinerated waste). The presence of chlorine is also unfavourable from the environmental point of view, disregarding the POPs issues.

Having in mind economically effective control of polluters, it is suggested to apply the mechanism of voluntary agreements, targeted first of all at maximum closing of the „chlorine cycle“ in the respective companies what means, balancing and subsequent minimisation of chlorine loses into all components of environment.

After discussions with the main sources of unintended POPs releases in the relevant sectors as well as with the Association of Chemical and Pharmaceutical Industry and with the Association of Pulp and Paper Industry, this seems to be the most feasible way from both economical and environmental point of views.

Alternatively, in case the voluntary agreements would not take place, or would not lead to requested release reduction, the government could impose obligatory POPs release monitoring and POPs emission charges. However, in this way, the secondary POPs releases from wastes and mainly from uncontrolled combustion or incidental fires would not be affected.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **2.** | ***To set up a framework for monitoring and mitigation of total releases of chlorine or other halogens containing pollution*** | | | | |
| 2.1 | Set targets for the period of 5-10 years | Total looses of chlorine into the environment expressed in per cents | After 6 months | ME SR | |
| 2.2 | Draft the text and develop a mechanism of voluntary agreement with the chemical industry | Signed voluntary agreement and existing mechanisms for reporting and verification | After one year | ZCHFP | |
| 2.3 | Draft the text and develop a mechanism of voluntary agreement with the pulp and paper industry | Signed voluntary agreement and existing mechanisms for reporting and verification | After one year | ZCPP | |
| 2.4 | Elaboration of balances, reports and program proposals for the particular companies and associations | Proposal of programs for reduction of chlorine pollution | Within one year after adoption of the agreement | Associations and companies | |
| 2.5 | Agreement and publishing of the programs | Published Association programs | After two months | ME SR | |
| 2.6 | Monitoring of implementation, adjustment of the targets, ongoing verification | Reduction of halogen compound releases into the environment | Ongoing | ME SR /authorised organisation | |

Utilisation of chlorine in industrial processes is one of the primary reasons for generation of unintended releases of the mostly known POPs. With regard to the properties of the remainder halogen substances (fluorine, bromine and iodine) as well as their related chemistry, it is appropriate to apply the precaution principle, and minimise in long term also the releases of other organic halogen compounds. This would mean expansion of the voluntary agreements also to other halogens and relevant industrial sectors (metallurgy, for example).

The problem of chlorine content in products is broader and relates also to measures No 8, 9 and 10.

### *3. To reach compliance in the pulp bleaching technology, based on molecular chlorine, with IPPC requirements within the period of ten years*

Pulp bleaching based on elementary chlorine is a technology with substantial potential for industrial accidents, difficult to operate, non-effective and non-competitive, as most of the developed markets are demanding pulp, which is not bleached by elementary chlorine.
This measure is in Slovakia currently concerning one company, where it could facilitate the investment decisions and at the same time would prevent possible efforts to import such an obsolete technology to Slovakia.

With regard to demanding preparation and financing of such a project for a company, a timeframe by the year 2010 is suggested.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **3.** | ***To reach compliance in the pulp bleaching technology, based on molecular chlorine, with IPPC*** | | | | |
| 3.1 | Stipulated in the legislation | | 2007 | ME SR | |
| 3.2 | Entering into force | | 2010 | ME SR | |

### *4. To eliminate uncontrolled thermal destruction of organic coatings from recycled raw materials for secondary metal production, to promote non-thermal mechanic de-coating methods*

PCDD/PCDF emissions from secondary steel production using scrap as raw material are up to 50 times higher than PCDD/PCDF releases from primary steel production using pig iron as raw material. The reason is contamination of the iron scrap with certain organic matters (rests of coatings, paints, grease and plastics). Particularly in case of non-ferrous metals, this organic components needs to be taken of the metals and the metallic components adequately separated prior to the melting process. In Slovakia, secondary copper production is currently operating, and certain non-ferrous metals (bras for example) are melted in small units (with capacity around 10 000 tons per year). The IPPC Directive does not control these small units; hence, no legal obligation to comply with BAT/BEP is stipulated for them

Problematic is mainly the de-coating of the organic coatings (paints, plastic) from the treated metals. To separate the plastic coatings from cables often improper methods such as cable smouldering are used, being exceptionally unfavourable from POPs emissions point of view. Currently, the branch of separation and treatment of metal scrap (for example environmentally sound separation of metallic and nonmetallic fraction) only constitutes in Slovakia. In addition, producers from Slovakia are offering appropriate equipment for mechanical non-thermal scrap treatment.

Importance of this sector will still grow mainly in view of the efforts to maximise the recycling of electronic as well as car scrap. Considering the constantly growing pressure to utilise secondary raw materials and to increase the volume of recycled materials, it is reasonable to assume that similar installations will gradually rise. In addition, electronic scrap (electric and electronic waste) and obsolete cars, being priorities from the point of view of metal separation, are included as commodities in the mandatory part of the Waste Management Program as well as among the priorities of the Recycling Fund (RF). It is necessary to prevent unfavourable practices while this branch is formed and in contrary, promote implementation of best available technologies by support from the recycling fund.

The available documents (BREF and Annex V to the POPs Protocol) recommend as BAT/BEP the following techniques:

- Pre-sorting scrap in order to fit the utilised technology, and separate the organic contaminants;
- Pre-treating scrap, for example stripping of plastic or PVC coatings, pre-treating cable scrap using only cold/mechanical methods; quick cooling of gases from melting oven in order to avoid PCDD/PCDF production;

- Using oxygen or oxygen-enriched air in firing, or oxygen injection in the shaft kiln (providing complete combustion and minimisation of waste gas volume);
- Catalytic oxidation of of-gases; and
- Adsorption on activated charcoal.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **4.** | ***To eliminate uncontrolled thermal destruction of organic substances from recycled raw materials for secondary metal production, to promote non-thermal mechanic de-coating methods*** | | | | |
| 4.1 | For thermal treatment of metal scrap set the same BAT requirements as for waste incineration | | 2007 | ME SR/SEI/ME con SR | |
| 4.2 | Use the recycling Fund to support this measure | | Ongoing | Recycling Fund | Commodity program OEEZ |

### *5. To modify current reporting methods and means concerning waste production, air emissions, water pollution*

The current procedures of environmental impacts reporting to be provided by the polluters are fragmented, often duplicate, and demand extensive administration. Hence, they are expensive for the polluters as well as for the state administration.

Nevertheless, they do not provide sufficient information to the state administration to ensure sufficient information about pollution sources in the most cost-effective way in order to ensure the following:

a. Effective monitoring of POPs by-products

b. Reporting commitments of Slovakia

Act No. 245/2003 Coll. on Integrated Pollution Prevention and Control with regard to the related enforcement documents, concentrates almost exclusively to air and water pollution (Annexes 1 and 2 of Decree 391/2003 Coll.). The mandatory reported data do not even allow assessment of compliance with BAT parameters, because the data on production volumes are voluntary and data on material and energy intensity are not required at all. Specific activity data, needed for emission estimation with the help of emission factors are also not required, what complicates the application of standard inventory methods.

It is suggested to amend the regulation and enlarge the mandatory reporting and specify the units/formats of the reported data related to particular sectors, so as to have possibility to assess potential for POPs releases already during the permission procedure (not only to air and water). Regular reporting into the Integrated Information System Registry, hence, monitoring of unintentional POPs production in Slovakia and reporting under the international treaties will be enabled as well.

It will be necessary at the same time adjust and enlarge the Integrated Information System Registry.

With regard to the typical POPs pollution sources as well as kind of generated POPs pollution, it is not recommended to require legally binding POPs release measurements.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***5.*** | ***Modify Act No. 245/2003 Coll. and its implementing regulations regarding data reporting on pollution and environmental impacts*** | | | | |
| 5.1 | Preparation, review and adoption of a legally binding instrument | Regulation / legal document | 2007 | ME SR | |
| 5.2 | Adjustment of the Integrated Information System registry | Functioning register, providing data on unintended POPs releases | 2007 | SEA | |

### *6. To develop and implement an education, training and course system, dedicated to employees working in sectors potentially contributing to unintentional POPs emissions*

Main factors influencing the unintentional POPs generation during the industrial processes, is the manner and particular technology operated e.g. setting and maintaining the critical parameters of the technology (retention time, temperature, oxygen excess, etc.)

Awareness about the possible consequences: generation of POPs and their impact on humans and environment as well as of consistent controlling of parameters, which might not be essential with regard to production quality or volume, but are important from point of view of POPs, are considered as main factors influencing operation in compliance with best environmental practices (BEP). BEP implementation is sector specific, and in order to be successful, it must be systematically and consistently demanded, and audited by the management.

It is suggested to develop sector specific training packages, particularly for the chemical and pharmaceutical industry, pulp and paper production, primary and secondary metallurgical industry, etc., which would contain individual modules for various management levels (strategic, executive and lower management) and for the workers, including guidance materials for trainers, and make them available to the enterprises.

At the same time, it is necessary to require that environment polluters which may unintentionally generate POPs, shall implement an education, training and course system for their employees.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **6.** | ***To develop and implement an education, training and course system, dedicated to employees working in sectors potentially contributing to unintentional POPs emissions*** | | | | |
| 6.1 | Identification of the sectors | List of concerned sectors/enterprises | 2007 | ME SR | |
| 6.2 | Definition of BEP-requirement, including | Legally binding | 2007 | ME SR | |

| | | | | | |
|---|---|---|---|---|---|
| | requirements for those, providing training on BEP | requirement concerning training for selected processes/sectors | | | |
| 6.3 | Ensuring elaboration, review and finalization of sector-specific training packages | Sector specific training packages | 2007 | ME SR | |
| 6.4 | Publishing and distribution of the training packages | Publicly available training packages (printed and electronic) | ongoing | ME SR | |
| 6.5 | Inspection of implementation in the relevant industry | | Ongoing | SEI | |

### *7. To develop a program to assess the amount of unintentionally produced POPs, generated by waste-wood combustion and to appraise the seriousness of this problem in Slovakia*

Biomass burning, including industrial waste-wood combustion is gradually spreading, and further increase of number and capacity of the industrial installations may be expected. Critical influence on this trend have in particular:

- Requirement and promotion to increase the share of renewable sources for energy production and
- Increasing energy prices and prices of gas and electricity, in particular for the smaller consumers.

It is likely, that this trend will still continue also with regard to international commitments of Slovakia concerning climate change, environmental requirements and the energy policy of EU.

According to some information sources, one of the important POPs by-products sources is waste wood or wood treated by organo-hallogenous compounds including DDT.

Information and measurement, which would allow assessing the importance level of this problem for Slovakia, are missing at present.

Therefore development of a program is proposed, which would allow assessing the following:

- Analysis of current status and trends in
  - biomass combustion,
  - characteristics of fuel-wood used
  - their potential for POPs generation
- Including sampling and test measurements.

Based on their findings, recommendations of relevant activities, and the conditions, by when they will be needed.

| | ***Activity / action*** | ***Requested output / indicator of success*** | ***Timeframe*** | ***Responsible institution/ body/sector*** | ***Note*** |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **7.** | ***To develop a program to assess the amount of unintentionally produced POPs, generated by waste-wood incineration and to appraisal the seriousness of this problem in Slovakia*** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 7.1 | Development of a program and securing of the necessary funds | Program | 2007 | ME SR | |
| 7.2 | Implementation of the program | Report, analysis of the present situation, Report – Proposal of measures | 2008 | ME SR | |
| 7.3 | To take decision on the measures | | 2007 | ME SR | |

### *8. To promote non-oxidative processes and BAT for destruction of wastes containing POPs and for destruction of wastes containing chlorine*

Besides unintended generation of POPs during industrial processes, major source of POPs releases are waste incineration-oxidation processes and handling with wastes, containing POPs, chlorine or other halogenous compounds, as already described in Measure 2.

It is considered necessary to set up an economic and legal framework to promote implementation of alternative non-combustion BAT-technologies for handling with such wastes. As these technologies are quite new, with only limited number of suppliers, their prices are higher when compared to combustion technologies. Hence, the unit price of treated waste is also higher.

It is recommended to set up in co-operation with the Ministry of Finance and the Recycling Fund favourable conditions, which would economically motivate generators and owners of such wastes to use non-oxidative processes for their disposal.
Besides taxes and fees, also direct Recycling Fund support for the disposal companies could be considered. With regard to other measures as proposed in this action plan, also a special program in the framework of the Recycling Fund could be considered to prevent or minimise unintended POPs production.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **8.** | ***To promote non-oxidative processes and BAT for destruction of wastes containing POPs and for destruction of wastes containing chlorine*** | | | | |
| 8.1 | To set up a working group (WG) comprising representatives from ME SR, MF SR a RF | A Working Group with clear mandate and task | 2007 | ME SR | |
| 8.2 | To propose measures and programs, including the necessary amendments of legal documents (if relevant) | Program proposal | 2007 | Working Group | |
| 8.3 | To launch the implementation of the program | | 2007 | ME SR/ MF SR /RF | |

### *9. To promote research in relevant areas*

POPs are generated not only by processes where chlorine-containing products are produced (e.g. pesticides), or chlorine-containing compounds are used as reagent (e.g. bleaching of pulp), but also by processes, mainly in chemical and pharmaceutical industry, where so-called chlorine reaction pathway is applied. While chlorine is present in some of the reaction steps in form of radical or salt, it has not necessarily to come up in the product.

With regard to specific properties of chlorine, such as reactivity and oxidising properties as well as to a certain tradition, for some of the products, practically do not exist alternative chlorine-less methods, which would be tried out on industrial level.

Identification and testing of alternative production processes is predominantly the role of basic and applied research in the area of organic chemistry, pharmacy, chemical technology and chemical engineering.

The concept of best available techniques and technologies as well as requirements for their implementing, are today embedded in several legal documents and decrees predominantly in the environment protection – air (e.g. waste incineration plants), wastes (handling with wastes, land filling) and management of polluters – Act on Integrated Pollution Prevention and Control, Framework Water Directive and others.

However, practical definition of what is still considered as BAT parameter and what is not, may be a problem as for different sectors BAT reference documents are entirely missing. Also in the existing BAT reference documents – BREF – the issue of unintended POPs production is very limited and usually not specified. Reference values as well as technical and technological specifications for unintended POPs production are missing.

For this reasons it is proposed to promote research in the following areas:

a. Alternative technologies to produce chemicals, which are currently produced by technologies based on chlorine, and/or radicals of chorine, or other halogen substances
b. Identification and definition of BAT for the particular sectors/technologies.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **9.** | ***To promote research in relevant areas*** | | | | |
| 9.1 | Allocate funds and develop a plan linked to National program for research and development and Competitiveness strategy till 2010 | | ongoing | MEdu SR ME SR | |
| 9.2 | Gather research results and update information resources, participate in project selection, set up of priorities and research | | ongoing | MEdu SR ME SR | |

## Time and financial plan

In the framework of NIP elaborated in 2003 (GEF supported project) a proposal of baseline version for financial plan was elaborated, which included the costs of measures as suggested in this activity, however, the costs of measures solved under different activities are mentioned elsewhere.

Measure 2. To set up a framework for monitoring and mitigation of total releases of chlorine or other halogens containing pollution does not require significant costs, even if its practical application is important. Costs of this measure are estimated for the whole period 7.376 mil SKK, out of which the majority is allocated for the Measure 2.6 Monitoring of implementation, adjustment of the targets, ongoing verification" represent major part of the costs with regard to their permanent character (5.920 mil SKK). It is assumed that major part of these costs will be covered by the state budget (4.736 mil SKK) in the budget of the Ministry of Environment. Part of the costs will be covered by the private sector (1.184mil SKK).

Measure 3. Cessation of pulp bleaching technology, based on molecular chlorine, by 2010 will trigger social impacts in the area of Zemplín region, where the concerned factory Bukocel Vranov is located, as job possibilities will be cancelled. Investments into this production are from the financial point of view questionable, among other reasons also because of ineffective energy husbandry of this enterprise.

Costs related to measure No. 4 regarding the requirement of elimination of the uncontrolled organic compounds removal from the recycled raw materials, was calculated based upon the expectation of modernised technology for removal of coating from these materials. According to available data, there are approximately 200 companies in Slovakia, which have collection, modification or processing of recycled metals as their main business. Out of these, 20 are expected to invest 5 mil. SKK into non-thermal processing technology for metal scrap treatment. Further 30 smaller companies are expected to increase their competitiveness by purchase of a similar technology worth 1.5 mil. SKK. This analysis is based on the presumption that Stockholm Convention will enter into force in 2007 and these companies will have two year transition period. Business sector costs related to investments into technologies will be 145 mil. SKK.

The impact of further measures is not calculated, as they are part of the other action plans or existing activities within the legislation process or inter-ministry discussions.

### 3.3.1 (b) Activity: Phase–out and disposal of PCB equipment

**Setting of priorities**

Based on assessment of results of the PCBs containing equipment and wastes inventory in Slovakia, considering the Stockholm Convention provisions and EU Directives as well as the agreed priority setting criteria, the following action plan measures are proposed:

1. **To assure inventorying of PCBs containing equipment;**
2. **To secure environmentally sound destruction of PCBs in Slovakia (equipment and other waste), with respect to BAT/BEP;**
3. **To assure and carry out decontamination of polluted areas;**
4. **To assure elaboration and implementation of technical standards concerning analysis, transportation, storage, exchange, decontamination and destruction of PCBs;**
5. **To carry out measures for decreased PCB entry into food chains and to effective decrease population exposure**
6. **To set up and implement a public awareness rising campaign; in particular adequate training of public as well as private sectors.**

The proposed priorities are elaborated in more detail in the following text. Each chapter ends with a table containing the proposed activities (column 1) in order to meet the requested outputs (column 2) the assumed timeframe (column 3), proposed institution/body responsible for the implementation (column 4) and a reference to further details and annexes of the NIP (column 5).

**Proposed measures**

***1. To assure inventory of PCBs containing equipment***

Need for detailed inventory of POPs pesticides is implied by the Stockholm Convention provisions as well as by the provisions of EU directives, but also by the necessity of preventing that PCBs contaminated equipment is deposited on landfills in uncontrolled way, without previous safe and environmentally sound disposal.

According to the Waste Act, this task is assigned to the Slovak Environmental Agency (Centre for Waste and Environmental Management, SEA CWEM Bratislava). The Agency is responsible for recording and updating of list of contaminated equipment. Moreover, on-site inspection of registration, recording and labelling of PCBs containing equipment needs to be ensured. Collaboration of two inspection bodies – Slovak Environmental Inspectorate and the Slovak Energy Inspectorate is anticipated.

Important is to ensure full involvement of the state administration, so that also sectors and state institutions, which did not have the necessary capacities, possibilities and ambition to carry out a detailed inventory until now, will be obliged to allocate the necessary financial and human resources so as to ensure complete inventory of PCBs, as well as PCBs containing equipment they are using or storing – the final objective being their destruction or decontamination.

This process is taking place already several years; therefore some of the provisions are already included in the current legislation in Slovakia. The requirements to co-ordinate ongoing inventorying of PCBs containing equipment as well as of state and movements of PCBs wastes; the requirements concerning haulers, transporters, storekeepers and organisations that are handling with PCBs, and analysing them in various media, are dealt by Waste Act, ME Decree No. 128/2004 Coll. amending ME Decree No. 283/2001 Coll., and Decree No. 509/2002 Coll. as well as Decree No. 135/2004 on decontamination of PCB containing equipment.
Analysis of present situation with regard to PCBs equipment and PCBs wastes and stockpiles, clearly indicates that it is necessary: to revise collaboration with organisations responsible for regulating, inspecting and replacing of equipment in operation (State Energy Inspectorate); with organisations responsible for regulating and inspecting of importing and exporting PCBs containing equipment and PCBs wastes; and to revise provisions for reporting of stockpiles as well as of state and amount of PCBs wastes, deposited in the landfills. It is also necessary to support the Slovak Environmental Inspectorate, role of which will be recording and exchange of information and reports. This means not only legislative back up of obligations the particular entities have assigned, but also their sufficient financing (for example to trace back reports on analytical results of PCBs content in certain media).

Not less important are steps concerning providing information on new obligations stipulated by the legislation; professional education and training of people professionally handling PCBs; and broad public awareness rising on PCBs. (Concerns SEA, National Labour Inspectorate, organisations providing training as well as NGOs).

An overview of the particular proposed measures, proposed responsible organisation, timeframe for implementation of the measure and the relevant reference, are listed in the table below.

| | ***Activity / action*** | ***Requested output / indicator of success*** | ***Timeframe*** | ***Responsible institution/ body/sector*** | ***Note*** |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **1.** | ***To assure inventory of PCB-containing equipment*** | | | | |
| 1.1 | Develop inspection mechanisms and collaboration of inspection bodies, which are responsible for handling with PCBs and PCBs wastes in the Slovak Republic | Memorandum of Understanding between the inspection bodies – signed and implemented in Plan of the Inspections | December 2006 | SEI | A functioning inspection mechanism is necessary for obligation enforcement |
| 1.2 | To prepare the Slovak Environmental Inspectorate to carry out inspection in this field, after the new legal instruments enter | Elaborated and implemented Inspection Plan | ongoing | SEI | |

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | into force (including sufficient funds to carry out analytical inspection) | | | | |
| 1.3 | Ensure availability of analytical methods to determine presence of PCBs, and sufficient capacities to carry out sampling, analyses and handling with probes, including their disposal | Adoption of guidelines on analytical methods; organization of inter-laboratory analytical testing | ongoing | SUTN | |
| 1.4 | Discuss and develop schemes of positive influence onto entities, having active roles and responsibilities in this area, mainly on small and middle-scale companies | Implementation of the information campaign | annually | ME SR, MEcon SR | |
| 1.5 | Supplement missing information concerning registered equipment in case of inaccurate or missing data, not enabling exact classification of PCBs type, amount and concentration | Supplementing of the database on the base of more precise information | Ongoing | SEA | |

***2. To secure environmentally sound destruction of PCBs in Slovakia, with respect to BAT/BEP***

From point of view of their sound destruction/disposal, PCBs create a problem due to their chlorine content and thus the possibility of dioxin and furane generation during incineration processes. Environmentally sound disposal relates besides the final destruction of PCBs also to safe decontamination of PCBs containing equipment such as transformers, capacitors, hydraulic systems and PCB wastes. A separate problem will be probably disposal of capacitors, more than 30 000 of which are currently registered in Slovakia, and other types of PCB (or other POPs) contaminated waste in agricultural sector. This is especially sensitive field due to insufficient financial resources in the waste holders. A serious doubt therefore appears that without a supporting scheme for collection and destruction of such waste by the state administration, important releases can happen and environmental compartments could be contaminated.

In general, four problem areas are to be considered:

1. Final disposal of PCBs
2. Decontamination of equipment
3. Disposal of PCBs capacitors
4. Destruction of PCB contaminated waste in agricultural sector

Slovakia is participating in the international program supporting non-combustion techniques for POPs destruction *(„Removal of Barriers that Impede Adoption and Effective Implementation of Available Non-combustion Technologies for POPs Destruction and Demonstration of Viability of these Methods"*) and aims at obtaining of a non-combustion POPs destruction unit in it's framework. The project was approved by the beginning of 2006. According to its time schedule, the PCB destruction unit could be installed during year 2007, moreover, PCB extraction unit from sediments and soils is expected during 2008. This project will positively influence the improvement of Zemplin area, as the unit will be installed closely to the highest identified amounts of stocks as well as the most important polluted area.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **2.** | ***To secure environmentally sound destruction of PCBs in Slovakia, with respect to BAT/BEP*** | | | | |
| 2.1 | Secure effective support of the program on non-combustion technologies for PCBs destruction | Adoption and implementation of the project | 2006 - 2010 | ME SR | |
| 2.2 | Elaborate a strategy for decontamination and sound disposal of PCBs in Slovakia; active state promotion to ensure its implementation with respect to obligations pursuant to relevant EU Directives; allocation of funds to decontaminate PCBs containing equipment in the state and public sectors and for the minute owners of such equipment | Adoption and implementation of a program for state promotion of collection, safe storage and final disposal of PCBs | December 2008 | Slovak government | |
| 2.3 | Create strategy for collection, decontamination and destruction of PCB wastes in agriculture, secure its implementation in compliance with obligations from EU directives, with active state support; allocation of resources for collection and destruction | Adoption and implementation of state support program for collection, safe storage and final destruction of PCB wastes | December 2008 | MEcon SR | |
| 2.4 | Respecting of legislative conditions for non-combustion technologies for PCB destruction | Updating of legal obligations in relation to EU directives | December 2006 | ME | Export limitations, combustion ban |
| 2.5 | PCB destruction with state support | Destruction of stocks in SR | Not later than December 31, 2010 | Slovak government | Support to safe collection, storage and destruction |

### *3. To assure and carry out decontamination of polluted areas*

To ensure decontamination of contaminated sites is the most problematic as well as expensive but at the same time, also the most important task with regard to environmental burden, population exposure and health risk in the concerned localities. Major problem is the pollution of open waste-water channel in Strážske locality, and resulting pollution of the Laborec River and the Zemplínska Šírava water reservoir, as consequence of previous PCBs production in the Chemko Strážske Company.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **3.** | ***To assure and carry out decontamination of polluted areas*** | | | | |
| 3.1 | To ensure continuation of monitoring in the contaminated sites, in order to assess the contamination range and to set up the decontamination procedures | Monitoring | ongoing | ME | |
| 3.2 | Incorporate POPs issues into investment strategy of environmental liabilities removal under ME responsibility | Adoption and implementation of the strategy | 2007 | ME | |
| 3.3 | Gradual decontamination of the contaminated sites; allocation of the necessary funds | Launching and successful termination of the decontamination | 31 12 2015 | Slovak government | |

### *4. To assure elaboration and implementation of technical standards concerning analysis, transportation, storage, exchange, decontamination and destruction of PCBs*

Important component of management of the PCBs wastes is implementation of technical standards and of procedures to authorise organisations, which are carrying out activities according to these standards.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **4.** | ***To assure elaboration and implementation of technical standards concerning analysis, transportation, storage, exchange, decontamination and destruction of PCBs*** | | | | |
| 4.1 | Elaborate technical standards for exchange of PCBs containing equipment in use | Technical standards | ongoing, linked to EU development | ME SR, SUTN | |
| 4.2 | Elaborate system for exchange of PCBs containing equipment in use | Methodical guide | December 2007 | State Energ. Insp. | |
| 4.3 | Elaborate procedures for inspection and labelling of decontaminated equipment | Methodical guide | December 2007 | SEI, State En. Insp. | |
| 4.4 | Propose a system of certified bodies for PCB handling - special actions as dismantling of capacitors, recycling, cleaning | Implementation of authorisation | December 2007 | ME SR | |

### *5. To take measures for prevention of PCB entry into food chains and effectively decreases human exposure*

The measures for prevention of contamination transfer from polluted areas into food chains are directly linked to the decreased human population exposure of the region. POPs are monitor in different environmental compartments, living organisms (including humans), as well as in the food chain. The highest POPs concentrations were found in environmental samples from Strážske region as a result of the former production in Chemko. High concentrations of POPs in an opened channel are transferred downstream to river Laborec, dam Zemplínska šírava and river Bodrog.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **5.** | ***To take measures for prevention of PCB entry into food chains and effectively decrease human exposure*** | | | | |
| 5.1 | Take measures for prevention of introduction of contaminated food and feed-stuffs to the market | Strategy of food safety | December 31, 2008 | ME SR, MA SR | |
| 5.2 | Také measures for prevention of contamination spread into river Laborec, Zemplínska šírava dam and river Bodrog | Extraction and destruction of contaminated sediments | December 31, 2010 | ME SR | |

### *6. To set up and implement a public awareness raising campaign; in particular adequate training of public as well as private sectors*

Pursuant to the recent strategy for dioxins, furanes and PCBs of the European Council and to the resolution of the European Parliament concerning implementation of the *Directive 96/59/ES on disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)* it is necessary to elaborate positive influencing schemes targeted to organisations, which are actively involved into relevant activities, within the state, public as well as private sectors. It is necessary to include handling with PCBs into the National Environment and Health Protection Strategy (decrease of population exposure and decrease of pressure on components of environment), the national management of chemicals, and into schemes of voluntary participation in environment protection.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **6.** | ***To set up and implement a public awareness raising campaign; in particular adequate training of public as well as private sectors*** | | | | |
| 6.1 | Define short-term, middle-term and long-term governmental policy goals in this area, and appropriate tools to ensure implementation of activities leading to decreasing of health and environmental hazards | Incorporation of POPs issues into Environmental Education Conception and National Education Program under MEduc | December 2007 | MEduc SR | |

## Time and financial plan

This particular action plan is one of the most financially demanding action plans in the NIP context. It is based on results of the inventory of PCBs-containing equipment, according to which 3 500 tons of such equipment were registered. Obligation to decontaminate these equipment requires substantial funds from the side of private sector. To support the success of the decontamination activities; i.e. that they are really implemented, and no contradiction between the "law" and "reality" will take place, the financial plan anticipates also state support corresponding to decontamination of 1 500 tons of equipment, what is equivalent to 116 041 mil. SKK. The private sector has to cover 147 692 mil. SKK, including also the

haulage to the destruction site. The destruction site is anticipated in Strážske. In case the waste will be disposed abroad, the costs of logistic will increase by further approximately 9 mil SKK.

This measure is envisaging also expenditures of the regional budgets. It concerns expenditures connected with decontamination of PCBs containing equipment in the ownership of schools and hospitals. Costing of these expenses is based on the inventory of such equipment; however, this inventory was, particularly in the education sector, not complete. This fact is considered as uncertainty of the expenditure costing, and it is expected that the real expenses may be 2-3 times higher.

Other expenses related to implementation of this action plan amount to 5,88 mil. SKK and are connected with elaboration of the necessary technical standards for handling, decontamination and labelling of equipment containing PCBs.

NIP proposal under GEF project in 2004 estimated the costs as shown in Annex 1, entitled "3.3.1 (b) Activity: Cost estimate for activity 3.3.1 (b) Public awareness raising campaign".

### 3.3.1 (c) Activity: Elimination of import and export of POPs (Article 3(2))

According to art. 3(2) of the Stockholm Convention the issues of POPs export and import elimination is secured in relation to the implementation of the Rotterdam Convention on issuance of prior consent after preliminary announcement of certain dangerous chemicals and plant protection preparations in the international trade. SR is preparing signature to this convention and the corresponding provisions of this convention are implemented by European Parliament and Council Regulation No. 304/2003 on export and import of dangerous chemicals. Act on chemical substances and Act on biocides solve the issues of import and export.

### 3.3.1 (d) Activity: Prevention of the production and use of new chemicals exhibiting characteristics of POPs (Article 3(3))

Reporting mechanism on chemicals introduced to the Slovak market is solved by the Act on chemicals that implements Commission Directive 93/67/EEC in compliance with Council Directive 67/548/EEC as well as Council Regulation (EEC) No. 793/93.

Reporting system is based on the level of reporting to the responsible body, i.e. Centre for Chemical Compounds and Preparations (CCCP) base in MEcon SR, MH SR and ME SR.

Introduction to the market as well as usage of chemicals is solved by MEcon SR order No. 67/2002 Coll. that issues a list of selected chemicals and preparations where the introduction to the market is restricted or banned.

Inventory of chemicals introduced to SR market during years 1999, 2000 and 2001, performed by CChSP shown that none of POPs chemicals listed in annexes A and B of the Stockholm Convention were present.

European Parliament and Council Directive proposal on registration, assessment, authorisation and restriction of chemicals (REACH), on establishment of European Chemical Agency and amendment of Directive 1999/45/ES and Regulation (ES) 850/2004 on POPs should introduce identical registration requirements for chemicals and their assessment related to their properties.

SR co-operates in assessment of active ingredient trifluraline by having a representative in PBT working group (persistent bioaccumulative and toxic chemicals) under DG ENV. Regulation (ES) No. 850/2004 on POPs lays down the obligation to introduce appropriate measures when the substance has persistent characteristics according to the Stockholm Convention, however, it does not solve the particulate measures to be introduced.

### 3.3.1 (e) Activity: Assessing and checking chemicals in use (Article 3(4))

**Setting of priorities**

According to the evaluation of Stockholm Convention requirements and EU directives, the following measures are proposed.

Individual priorities are elaborated in more details in the following text. Each chapter is ended by a table showing the proposed actions (column 1) in order to reach the required outputs / indicators (2), foreseen time frame (3), suggested responsible body (4) and note (5) with a reference to further details and annexes of NIP.

**1. Personnel strengthening of responsible organ for assessment of new chemicals with POPs characteristics according to Stockholm Convention requirements**
**2. Assurance of effective system control system for usage of industrial chemicals having POPs characteristics**

## Proposed measures

### 1. Personnel strengthening of the responsible body for assessment of new chemicals with POPs characteristics according to the requirements of the Stockholm Convention

In the field of plant protection preparations and due to its membership in EU, SR co-operates in the assessment of the active ingredient trifluraline by a representative in the working group PBT under DG ENV.

SR should make some efforts in order to ensure active participation of its expert capacities also in the field of assessment of industrial chemicals whenever it should be necessary in relation to the EC activities. Thus, personal and technical strengthening is needed of existing capacities, i.e. bodies who contribute to the risk assessment of new chemicals for human health and the environment in compliance with the Chemical Act.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***1.*** | ***Personnel strengthening of the responsible body for assessment of new chemicals with POPs characteristics according to the requirements of the Stockholm Convention*** | | | | |
| 1.1 | Personal and technical strengthening of existing bodies | | ongoing | ME SR, MEcon SR, MH SR | |

### 2. Ensure an effective control system of usage of chemicals having POPs characteristics

Slovak Trade Inspectorate (STI) is a body performing the market control. It co-operates with the Centre for chemical substances and preparations, EU control bodies as well as EU member states.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **2.** | ***Ensure an effective control system of usage of chemicals having POPs characteristics*** | | | | |
| 2.1 | Ensure control system in relation to EU institutions activities | According to EU activities | ongoing | ME SR, MH SR, MEcon SR | |

### 3.3.1 (f) Activity: Country-specific exemptions

The Stockholm Convention pursues in its Article No. 4 possibility for each party to register one or more types of special exemptions according to the Annex A or B by a written notice. SR did not ask secretariat for any special exemption according to the Annex A or B by now.

### 3.3.1 (g) Activity: Reduction of total releases from unintentional production

Reduction of total releases from unintentional production falls under the basic obligations of POPs Protocol to the Convention on Long Range Transboundary Air Pollution (so called POPs Protocol) defined in Art. 3 of this protocol.
SR should ensure reduction of individual POPs total emissions from reference year value (that is 1990 according to the Announcement of Ministry of Foreign Affairs SR No. 367/2003 Coll.). In order to achieve this target, the following measures are recommended:
- best available techniques, taking into consideration Annex V for each new stationary source in the category of large stationary sources for which Annex V identifies best available technique,
- strict emission limits as mentioned in Annex IV or even more strict for each new stationary source in the corresponding category, taking into consideration Annex V. Party can apply also alternative strategies for emission reduction that will lead to identical total emission level,
- best available techniques taking into consideration Annex V for each existing stationary source in the category of large stationary sources that have identified best available technique in Annex V if technically and economically feasible. Party can apply also alternative strategies for emission reduction that will lead to identical total emission level,
- emission limits as mentioned in Annex IV or even more strict for each existing stationary source in the respective category if technically and economically feasible, taking into consideration Annex V. Party can apply alternative strategies for emission reduction tat will result in identical total emission level,
- effective measures for emission reduction from mobile sources taking into consideration Annex VII.

In order to assist the Stockholm Convention parties to quantify PCDD/PCDF, UNEP Chemicals issued „Standardised Toolkit for Identification and Quantification of Dioxin and Furan Releases“(UNEP Chemicals, 2003), that is also used in the methodology for POPs air emission inventory elaborated in the framework of project „ *Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)* “ in 2003.
POPs air emission inventory is performed in SR according to this document. A report containing notes to this methodology is attached to this document, as well as few updated emission factors (corresponding to the new version of UNEP Toolkit dated 2005, but also Czech and Polish methodology). This report will serve as a basis for Action plan for identification, characterisation and solution of releases of listed POPs (PCDD/PCDF, HCB, PCB and PAH) in compliance with Art. 6 of Regulation (ES) No. 850/2004 on POPs in relation to Art. 5 of the Stockholm Convention on POPs and Art. 3 of POPs Protocol.
This Action plan that should comprise also implementation of POPs releases inventory and measures for emission reduction compared with year 1990, taking into consideration a broad spectra of equipment that require definition of time frame in order to reach BAT for new sources, mostly for national priority categories, is prepared as a separate document linked to financial resources allocations needed for implementation of the Stockholm Convention obligations till 2025 (this will elaborated in a separate document delivered to SR government session).

### 3.3.1 (h) Activity: Identification and environmentally sound management of stockpiles, articles in use and wastes

According to the Stockholm Convention requirements, POPs pesticide inventory results as well as agreed criteria for priority setting the following measures are most important:

1. **To trace the stored POPs pesticide and PCB stockpiles (spare fills) in order to ensure their storage till their destruction and further destruction by environmentally sound way**
2. **To secure environmentally sound destruction of POPs pesticides in Slovak territory, with application of BAT/BEP**
3. **To choose appropriate technology for PCB containing waste destruction**
4. **To prepare and perform information campaign for public awareness raising, but mostly appropriate training of employees performing control of obsolete pesticides stockpiles and wastes in agricultural sector**

Individual priorities are elaborated in more details in the following text. Each chapter is ended by a table showing the proposed actions (column 1) in order to reach the required outputs / indicators (2), foreseen time frame (3), suggested responsible body (4) and note (5) with a reference to further details and annexes of NIP.

**Proposed measures**

1. **Investigation of POPs pesticide stockpiles and PCB wastes (refills) in order to ensure their safe storage before their destruction and than their environmentally sound destruction**

Obsolete plant protection preparations stockpiles form a specific waste type, and it is important to refer to the basic definition of waste as stated in Waste Act. The act pursue the basic obligations of waste holder, including the obligation to collect separated wastes according to their type and secure them against devaluation, stealing or other unwanted spill, as well as obligation to collect separately dangerous waste according to their type, to label them and to handle them in compliance with this act and the other special provisions.

The link to the Waste Act is laid by the Act No. 127/2006 Coll. on POPs, implementing Regulation (ES) No. 850/2004 on POPs. The obligations to handle the stockpiles as being waste by safe, effective and environmentally sound manner are the most important from the environmental point of view. Enforcement of these provisions is based on Slovak Environmental Inspectorate.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | *1* | *2* | *3* | *4* | *5* |
| ***1.*** | ***Investigation of POPs pesticide stockpiles and PCB wastes (refills) in order to ensure their saf storage before their destruction and than their environmentally sound destruction*** | | | | |
| 1.1 | POPs pesticides and PCB (refills) stockpiles inventory | | ongoing | MEcon SR (CAITI), ME SR | |

**2. To ensure environmentally sound destruction of POPs pesticides in SR territory, with application of BAT/BEP**

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***2*** | ***To ensure environmentally sound destruction of POPs pesticides in SR territory, with application of BAT/BEP*** | | | | |
| 2.1 | Selection of appropriate technology for POPs pesticide destruction | Appropriate technology | ongoing | ME SR, MEcon SR | |

**3. Selection of appropriate technology for PCB containing waste destruction**

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***3*** | **Selection of appropriate technology for PCB containing waste destruction** | | | | |
| 3.1 | Selection of appropriate destruction technology for PCB containing waste | Appropriate technology | ongoing | ME SR | |

**4. To prepare and to implement information campaign in order to raise public awareness, but mostly the necessary training of employees controlling the obsolete pesticide stocks and wastes in agricultural sector**

This measure is elaborated in more details in the chapter 3.3.2 (j) Information exchange, education and public awareness rising.

### 3.3.1 (i) Activity: Identification and remediation of contaminated sites

**Setting of priorities**

According to the Stockholm Convention requirements as well as EU directives priority setting the following measures are proposed:

1. **Ensure ecological investigation of PCB contaminated areas**
2. **Elaborate strategy for remediation of contaminated areas**
3. **Perform remediation activities**
4. **Establish workplace for management, coordination, control of remediation activities, as well as communication with cooperating organizations**

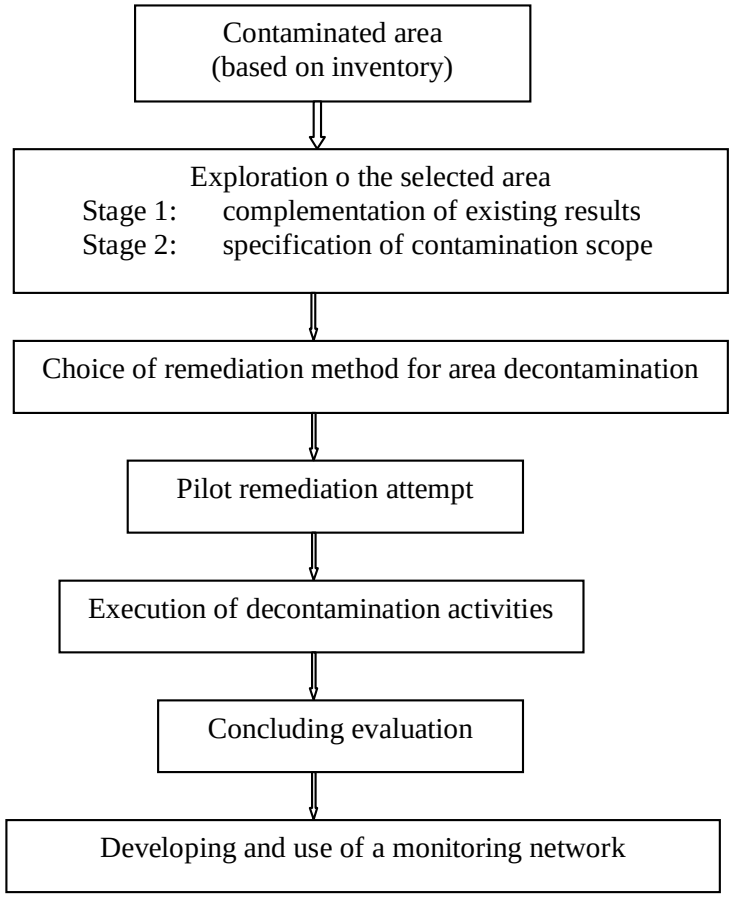
It is necessary to concentrate to the most spread contaminant – PCBs – on POPs polluted areas (the highest amount of reliable data, identified sites – appearance areas, most important impact to biota and human body).
Based on the recent data the highest emphasis should be concentrated to [8] PCB production facilities in Chemko Strážske (including surrounding areas), the waste channel from PCB production, close Laborec river including the channel, the former asphalt coating facilities on the whole SR territory.

**Strategy of polluted areas approach**

The finished stage of inventory of POPs-polluted areas has been affected by previously unsystematic collection of relevant data, what applies also to areas that are in the above (mostly in chapter 2.3.6) described as most polluted and most endangered. The data obtained from until now realised projects in these areas lead to useful conclusions with respect to assessment of the rate of pollution of these areas. Nevertheless, we recommend to subject of these priority areas to a targeted research in order to quantify the scope of pollution.
Strategy and technology of area decontamination is contingent on thorough knowledge of the contaminated area and degree of its contamination. General approach to contaminated area that is in accordance with the above can be characterised by scheme below (Fig. 3.3.1/1).

[8] More details in chapter 2. 3. 6 Polluted areas

**Approach to contaminated area** Figure 3.3.1/1




This approach is based on recommended procedure in terms of „A Federal Approach to Contaminated Sites – CSMWG Canada"(Guidance – Set 6). Proposal of exploration activities should reflect to-date knowledge of the site in following areas:

- scope of contamination (degree of pollution and its spatial dimensions),
- natural conditions at this site relating to threat of spreading of the contamination
- and thus endangering individual elements of the natural environment and eventually the human organism. This knowledge has the purpose of contamination specification, description of distribution channels of the contaminant from the pollution source to final recipient (human organism and environment), that can result in proposal of ways in which the area can be decontaminated and remedied.

Based on the above, remediation methods are proposed, taking into account scope of decontamination activities, amount of material to be decontaminated and its properties (degree of contamination, contaminated matrix – soil, water, equipment, other contaminated wastes, etc.) and economic and time requirements of these activities.

Proposal of remediation methods, especially the technology of decontamination should reflect specific characteristics of the contaminated material and also distance of individual contaminated sites, current legal limitations for handling with such kind of contaminated material (waste), etc.

**Principles and sequence of proposed exploration and remediation activities**

Proposed exploration activities should follow in several stages, from general characterisation of the area to its detailed examination. Each stage should be finished by a stage report and proposal of further exploration activities based on obtained knowledge.
Each stage of the exploration would include evaluation of all obtained data and make a preliminary proposal of decontamination technology.

**Problem identification**

Based upon current results from polluted areas inventory and their monitoring we identify following problems:

**1. Ecological exploration of the areas identified by inventory**

As there is insufficient relevant data on scope of pollution in individual areas, there are some uncertainties in quantification and further steps necessary for their remediation. According to the extent of polluted areas (68 asphalt mixing plants and larger area of Strážske) and estimated cost of exploration, there are following problems:

a. strategy of realisation of the exploration activities
b. exploration methodology
c. unified analytical methodology of PCB detection in the matrix
d. securing of exploration capacities
e. co-operation with local specialised self-government
f. execution of exploration activities
g. monitoring of areas with identified PCB presence

**2. Strategy of remediation of contaminated areas**

With regard to results of ecological exploration we identify following problems:

a. prioritisation of the areas for decontamination
b. processing of technical and economic aspects of remediation in individual areas

**3. Execution of remediation activities**

Following the results of addressing the issues described above, we identify following problems:

a. financial backing of remediation activities
b. technical and technological procedures for individual areas
c. co-operation with local governments
d. co-operation with non-government organisations
e. co-operation with the media

**4. Establishment of a management and co-ordination body.**

For securing of an effective solution of the above tasks, the following problem was identified: Exploration and land sanitation are activities that clearly follow one after another. Evaluation of the results of individual examination stages with various exploration techniques, or of the

land sanitation together with quantities of administrative and legal activities and a variety of sanitation operations, requires co-ordination of these activities by a public body that is familiar with the NIP issues and objectives. In addition, representatives of the organisations that are most affected by the problem with contaminated area should be a part of this body. It would be local public administration representatives, affected landowners, local government representatives and representatives from the local NGOs.

It follows from the above that co-ordination of the tasks for the contaminated area will be assigned to a responsible body (group) which will partially consist of members that carry out this work during entire period and partially of members accredited by this work only for their areas (local public administration, local NGOs and affected local land owners).

Permanent members of the headquarters would be:

- ME SR representative - chairman
- ME SR representative (SHMI Bratislava as implementation institution of this project)
  - 1. Vice-chairman, (executive)
- MEcon SR representative -2. Vice-chairman
- MA SR representative – member
- NGO representative - observer

Non-permanent members of the headquarters depending on their relationship to individual addressed contaminated areas would be:

- VÚC representative – 3. Vice-chairman
- Representative of the specialised local public administration (environment) - member
- Local government representative - member
- Representative of the affected area land owner - member
- Local NGOs representative - member

**Proposed measures:**

In relation to the recommendations for planning and elaboration of the Stockholm Convention - Recommendation, group 6: „Investigation of POPs contaminated areas and action plan“ as well as recently performed works, the following activities for this field are proposed:

| | *Activity* | ***Required output/ Indicator of success*** | ***Time schedule*** | ***Responsible institution/ ministry/ body*** | ***Note*** |
|---|---|---|---|---|---|
| *0* | *1* | ***2*** | ***3*** | ***4*** | ***5*** |
| **1** | ***To secure ecological exploration in PCB contaminated areas in Strážske region and on the sites of former asphalt mixing plants*** | | | | |
| 1.1 | Prepare implementation strategy for these activities | Guideline | December 2007 | ME SR | |
| 1.2 | Prepare methodology of the exploration | Methodical guideline | December 2008 | ME SR | |
| 1.3 | Unify the analytical methods used in laboratories accredited for chemical analyses of soils and other PCB-containing matrices and secure their obligatory use | Methodical guideline | Ongoing, linked to EU activities | ME SR | |
| 1.4 | Secure capacities for implementation of such analytical work + carry out the analyses | Methodical guideline | Stepwise | ME SR | |
| 1.5 | In co-operation with specialised local governments secure entrance to contaminated areas that are subject to ecological examination | Methodical guideline | December 2007 | ME SR | |
| 1.6 | Secure co-operation with specialised local governments | Methodical guideline | Ongoing | ME SR | |
| 1.7 | Carry out the ecological examination | Methodical guideline | Ongoing | ME SR | |
| 1.8 | Secure regular monitoring of the examined area | Methodical guideline | Ongoing (5 years after completion of the recovery activities) | ME SR | |

According to the results of investigation:

| | *Activity* | ***Required output/ Indicator of success*** | ***Time schedule*** | ***Responsible institution/ ministry/ body*** | ***Note*** |
|---|---|---|---|---|---|
| *0* | *1* | ***2*** | ***3*** | ***4*** | ***5*** |
| **2.** | ***Prepare strategy for contaminated area recovery*** | | | | |
| 2.1 | Prioritise contaminated areas for their recovery, taking into account mainly the effect of contamination on human organism or its danger to the environment | Incorporation to Investment strategy of environmental burdens removal in SR | 2007 | ME SR, MH SR | |
| 2.2 | Process technical and economical indicators and technology requirements (procedure of decontamination) or the equipment for decontamination of the contaminated (environment) | Incorporation to the proposal of act on environmental burdens | 2007 | ME SR | |

For the remediation works:

| | *Activity* | ***Required output/ Indicator of success*** | ***Time schedule*** | ***Responsible institution/ ministry/ body*** | ***Note*** |
|---|---|---|---|---|---|
| *0* | *1* | ***2*** | ***3*** | ***4*** | ***5*** |
| **3.** | ***Performance of the decontamination activities*** | | | | |
| 3.1 | Secure financing of the decontamination activities | Separate part of financial resources for NIP | Stepwise | ME SR | |
| 3.2 | Process technological and technical work procedures | Report | 2007 | ME SR | |
| 3.3 | Co-operate with the local government on popularisation of this activity | Guideline | Ongoing | ME SR | |
| 3.4 | Co-operate with NGOs | Guideline | Ongoing | ME SR | |
| 3.5 | Medially promote this activity and, its results and impact on the environment | Guideline | Ongoing | ME SR | |
| 3.6 | Carry out the decontamination activities | | Ongoing | ME SR | |

In order to secure the above-described measures, as well as leadership, co-ordination, control and exchange platform for co-operating bodies and organisations, following measures are to be taken:

| | ***Activity*** | ***Required output/ Indicator of success*** | ***Time schedule*** | ***Responsible institution/ ministry/ body*** | ***Note*** |
|---|---|---|---|---|---|
| *0* | *1* | ***2*** | ***3*** | ***4*** | ***5*** |
| **4.** | ***To establish a headquarters for leadership, co-ordination and control of exploration and sanitation activities, as well as for the communication with co-operating parties; to create statute of this body*** | | | | |
| 4.1 | Elaboration of proposal for headquarters, personnel hiring, statute | Incorporation to the Act proposal on environmental burdens | Linked to the Act | ME SR | |
| 4.2 | Operation of the headquarters | Regular Activity Reports | Ongoing | ME SR | |
| 4.3 | Evaluation of work and transfer of the agenda to successor institution | Guidance to the evaluation and transfer of agenda in relation to Act on environmental burdens | Flexibly, according to activities | ME SR | |

## Time and financial plan

Financial plan for this action plan has been prepared for several alternatives. First action plan alternative calculates also with the decontamination activities, in the same way as the measures propose. The second alternative does not calculate expenses for carrying out the decontamination within the considered horizon, i.e. until 2010.

In the framework of NIP proposal under GEF project, the following cost estimates were elaborated in 2004:

### Version 1 – financial plan including decontamination activities

Total expenses of this alternative during considered time period– 694,713 mil SKK.

The costs of measures 1 and 2 of the action plan, i.e. the identification of contaminated areas, preparing appropriate methodologies for assessing the level of contamination and of strategies and regular monitoring are estimated to be 81, 032 mil. SKK. Largest expense among these costs is the identification of the polluted areas, which assumes measurement under about 70 asphalt mixing plants and contaminated area in Zemplín which together amount to 70,4 mil SKK.

Headquarters costs – measure 4 of the action plan amount to 10,926 mil. SKK during the entire period. Financing of these costs is expected to come from the state budget in each relevant year, from the chapter of the Ministry of Environment SR.

Organisationally and financially much more demanding are the measures relating to the decontamination itself. This assumes implementation of version 1 from the action plan Pesticides and PCB-containing equipment; here installation of the UNIDO project technology provides opportunities for broader and better planned decontamination. This concerns mainly decontamination of the Zemplín region areas, specifically Zemplínska Šírava, selected parts of the Laborec River and especially wastewater channel of Chemko Strážske.

The financial plan assumes that costs of decontamination of this area will be covered by a consortium of Košice region, stakeholder towns Michalovce and Strážske, as well as Bodrog and Hornád basin, which was created for this purpose at the end of 2003. Decontamination-related costs are calculated based on UNIDO project results (Use of non-combusting technologies on waste decontamination in Slovak Republic). The financial plan, as well as this project assumes financial coverage of this project by this consortium. Estimated time horizon for the decontamination of this area is the year 2016. Only proportion of the costs is listed in the financial plan.

Costs for the decontamination of the land under asphalt coating plants are estimated to total at 1 124 mil. SKK. Yearly contribution from the businesses in the amount 124 mil. SKK is expected. This expense was calculated consistent with TR2 results, Annex 7 to the Chapter 6, which assumes costs for decontamination of land under coating plant of Stropkov type to be 62 mil. SKK. Time horizon of 10 years (2015) was selected for the decontamination of expected 20 environmentally problematic coating plants. The proposed financial plan contains only proportional part of the costs.

Costs of decontamination are not involved in NIP. These costs were not possible to estimate – the reply to such question was expected from the works under the activities 1. and 2.

Costs of decontamination until 2010 without discounting amount to 1 500 – 2 000 mil. SKK. Hence the expected yearly cost will be about 150 mil. SKK.

Costs for decontamination of areas are listed in tables under regional budgets. It is assumed that EU Structural funds will be used for their coverage, having each self-government region as a beneficiary. Unfortunately, for the actual planning period such request could not be approved as these measures are not involved in the Basic infrastructure Operation Plan.

Thus, it is of utmost importance to accept such measures of NIP that will be directly incorporated in the National Strategic Reference Framework (2007 – 2013). Only by this step

appropriate financial resources could be secured that will reflect the results of the above measures.

**Version 2 – financial plan without the decontamination activities**

Total cost of this alternative during considered time period– 92,408 mil SKK.

Costs of this action plan alternative are decreased by the costs of the decontamination activities themselves. The costs of other activities remain to full extent as described in previous alternative.

In the framework of NIP proposal elaboration, under GEF project in 2004, the cost estimates were elaborated that are presented in Annex 1 of NIP, chapter 3.3.1 (i), Activity: Cost estimate for activity 3.3.1 (i) Identification and remediation of contaminated areas.

### 3.3.2 (j) Activity: Public information, awareness and education

**Priority setting**

With regard to the conclusions drawn in the situation analysis of SR (chap. 2.3.7), it is apparent that Slovak public needs to be provided with relevant information on POPs in a systematic manner and with regard to specific target groups. Establishment of information flows for both expert and general public is a requisite for fulfilment of the Stockholm Convention requirements so that the public will not be just a passive observer of the planned measures, but it will also actively require and support these changes – also in case of apparent negative effects in socio-economic area.

Individual priorities are elaborated in more details in the following text. Each chapter is ended by a table showing the proposed actions (column 1) in order to reach the required outputs / indicators (2), foreseen time frame (3), suggested responsible body (4) and note (5) with a reference to further details and annexes of NIP.
With respect to the specific features of the situation in Slovakia, the priorities for public involvement were identified as follows:

**Proposed measures**

**Short-term priorities:**

*A.1. Target group: In habitants of the contaminated areas – Zemplín:*
*Goal: Full public awareness about the hazards, so that they can decide on their "behaviour pattern" on their own*
*A.2 Target group: plant-inspectors and Customs administration*
*Goal: Raising of the awareness among plant-inspectors and Customs administration employees*

*Measures:*

- **To identify spatial distribution and size of affected population – on the level of administrative units.**
- **To prepare a proposal of a leaflet that will be distributed to all households, containing reasonable arguments and stressing the health of future generations.**
- **To secure printing of the leaflets**
- **To secure distribution of the information – local governments and local NGOs**
- **To involve NGOs also into creation of content of the materials (Greenpeace, etc.)**
- **To use local media for dissemination of the information (press, radio, TV)**
- **To propose a special training program (specific training packages) for the plant-inspectors and Customs administration employees**
- **To prepare their further fieldwork regarding (illegal) imports of plant protecting preparations – with regard to the expected changes of customs law after Slovak entry to EU and new regime on the borders/ in customs warehouses / transport nodes.**

| | *Activity* | *Required output* | *Time horizon* | *Responsible institution /ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| 1 | Population size identification – Michalovce district | Number of households | 2007 | SOSR | |
| 2 | Preparation of the information material – design, printing | Information material | 2007 | SEA | NGO involvement |
| 3 | Distribution | Information material | 2007 | Local government | NGO involvement |
| 4 | Design of the training program for the plant-inspectors | Training program available to the inspectors | 2007 | CAITI | |

**Medium-term priorities**

*B.1. Target group: industrial employees encountering POPs (especially PCB – loading, disposal, transport…)*

*Goals: - to minimise working exposure hazards*

*- to increase awareness of the need of disposal compliant to prepared legal regulations*

*Measures:*

- **To identify size of the group – National Labour Inspectorate (NLI) + database of equipment, production factories under BAT/BEP**
- **To prepare information material**
- **To secure printing**
- **Distribution**
- **Training program for the production workers and middle management (decision-making authority for the choice of technology), use of environmental management systems, involvement of interest groups and associations active in the area of safety and health protection in work, etc.**

The table below presents the individual proposed measures, responsible body, time frame for measures implementation and reference to the measure.

| | *Activity* | *Required output* | *Time horizon* | *Responsible institution /ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| 1 | Identification of the target group size | Number of addressees | 2007 | NLI | |
| 2 | Preparation of the information material – design, printing | Information material | 2007 | NLI | |
| 3 | Design of the training program for the industrial employees | Prepared training program | 2007 | NLI | |

**Long-term priorities**

*C.1. Target group: public (countryside population, but also city agglomerations – local gardens and cottages)*
*Goal: To minimise home burning as a POPs source*

*Measures:*

- **Media campaigns - press, state TV, radio broadcasting, local media**
- **Use of local governments and NGOs**

The table below presents the individual proposed measures, responsible body, time frame for measures implementation and reference to the measure.

| | *Activity* | *Required output* | *Time horizon* | *Responsible institution /ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| 1 | Preparation of background information for media campaigns | Background information available to the media | Dec. 2006 | SEA | |
| 2 | Involvement of the local governments and NGOs to distribution | Background information available to local governments and NGOs | continuous | Local governments | |

Note: It is necessary to consider the possibility of raising funds from alternative sources, e.g. grant schemes and foreign donors that might be used also for the NGOs.

*C.2. Target group: Schools*
*Goal: To continuously supplement the subject matter taught to pupils of primary and secondary schools, as well as to students of teaching universities who will afterwards enter into the teaching and education process.*

*Measures:*

- **Formal teaching and education process – transformation of content,**
- **Cooperation between ministries (i.e. M. of Education SR, ME SR, MA SR, NGOs)**
- **Supplementation of study programs on pedagogical, medical and veterinary schools**

The table below presents the individual proposed measures, responsible body, time frame for measures implementation and reference to the measure.

| | *Activity* | *Required output* | *time horizon* | *Responsible institution /Ministry/ Body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| 1 | Supplementation of basic curricula | Expert (contentwise and methodical) materials for supplementation of curricula | To be specified in relation to MEdu SR conception and strategy | MEdu. SR, ME | |

| | | | | | |
|---|---|---|---|---|---|
| 2 | Preparation of supplements to individual university study programs | Materials for study programs | Continuously related to section 1 | MEdu. SR, ME | |

*C.3. Preparation of information strategy on POPs*

Goal: implementation of information about POPs into existing information systems; in case of t heir insufficient functionality, proposal of an independent system for hazardous chemicals

*Prerequisites:*

- Co-ordination between ministries and sectors
- POPs co-ordination body as optimal solution for relationships between ministries in the area of hazardous chemicals and other contingencies
- Institutional and methodical support for the implementation of proposed priorities in the area of public involvement

Co-ordination of activities focused on implementation of Stockholm Convention in the area of public involvement presents an independent set of problems and challenges. Because of their specific characteristics and general applicability, these problems were not addressed among the other groups of priorities. The urgency of addressing the co-ordination tasks also follows from the other action plans.

Co-ordination of the above listed activities can be addressed in two ways:

1. Under co-ordination of ME SR (Public relations department, in co-operation with SEA) and in co-operation with other affected ministries and institutions,

2. By entrusting it to an independent co-ordination body, which would have competencies also in other areas, i.e. prepared National POPs Office.

It is also possible to combine these alternatives. A combination appears to be an optimal solution, with regard to already existing competencies of the ministry and its institutions and expected competencies of the co-ordination body on POPs, other hazardous chemicals and their groups, and alternatively also further relevant conventions and Slovak international commitments.

Implementation of the measures will require use of various methodical approaches applied to time horizons dependent on practical solutions to the priorities of the other action plans. Apart for regular informing, also explanation campaigns will be important, for example in relation to implementation of new legislation (or amendment of existing legislation), monitoring of health status of the human population, etc.

**Time and financial plan**

Activity: Public awareness rising assumes total cost of 46,646 mil. SKK, largest cost items being media campaigns with the aim to increase public awareness. This item amounts to 31,390 mil. SKK and should be in budget chapter of the Ministry of Environment SR.

Another cost item that is substantial is the cost of supplementing of the curricula for primary and secondary schools, in the amount of 5,765 mil SKK. It will be mainly proportional costs

of re-written text books. All of these costs should be covered from the state budget chapter of ME SR in relevant years.

Businesses will contribute mainly by covering the cost of training of their employees from different management levels. The cost of training during the considered period will be 7,38 mil. SKK.

NIP proposal under GEF project estimated the costs in year 2004 as shown in Annex 1, entitled 3.3.2 (j) Activity: Cost estimated for activity 3.3.2 (j) Information exchange, education and public awareness rising.

### 3.3.2 (k) Activity: Research, development and monitoring

**RESEARCH AND DEVELOPMENT**

**Setting of priorities**

Taking into account requirements of individual action plans, R&D projects should focus on following POPs issues:

1. **movement of POPs in the environment, fate of POPs and their tranformations**
2. **environmentally appropriate manner of PCB disposal**
3. **use of non-incinerating technologies for final POPs disposal**
4. **methods for detecting the PCB presence**
5. **procedures for decontamination of polluted areas**
6. **alternative ways of production of different chemicals, which are currently produced from compounds and radicals containing chlorine and other halogens**
7. **replacement of problematic chemicals by safe replacements**
8. **determination and definition of BAT parameters and technologies in individual sectors and for individual productions, especially from the perspective of POPs production:**
   - **quality and safety of foodstuffs**
   - **impact of POPS to human health**

Projects which might be solved on state R&D orders will be relevant for following research and development areas:
- natural sciences
- technical sciences
- medical and pharmaceutical sciences
- agricultural sciences

**Subjects having appropriate capacities for solving R&D tasks or projects in SR:**

Possibilities for projects are present e.g. in preparation of separate sub-programme of state research and development according to art. 23 section 4 Act No. 172/2005 Coll. on organisation of state support to research and development.

The strongest potential should be found in organisations skilled in international co-operation and commercial services in the issues of chemicals:
- Research Institute of Chemical Technology,
- Research Institute of Soil and Soil Protection,
- Research Institute of Paper and Pulp,
- Food Research Institute,
- Research Institute of Veterinary Medicine,
- Slovak Health University – Institute of Preventive and Clinical Medicine,
- Central Agriculture Control and Testing Institute,
- selected workplaces of Slovak Academy of Sciences and university departments.

As the state obligations resulting from international conventions are binding and they touch also the business sector as well as non governmental organisations, it is reasonable to

incorporate the non-profit sector and business sector into R&D in compliance with art. 23 section 4 of Act No. 172/2005 Coll. on organisation of state support to research and development.

**Proposed measures**

Specification of measures will be done in close co-operation of ME and Ministry of Education in relation to the National Programme for Research and Development in the framework of specification of allocation of financial resources to this programme. National Strategic Reference Framework for years 2007 – 2013, with an outlook to year 2025 will be considered in relation to Lisbon strategy, that will be elaborated in a separate document delivered to SR government session, dealing with e.g.:

1. improving of Information System of Research and Scientific Potential of Slovakia (ISRSP SR),
2. financial strengthening of research and development institutions in SR,
3. more effective exploitation of actual expert capacities of research and development with an option to prefer priority targets of economy development and state science and technical policy targets,
4. more effective link of basic research to applied research, related to exploitation of optimal management of institutes, other research and development organisations and their economies.

**Conclusions**

Act No. 172/2005 Coll. rejected state contracts for research and development. Agency for Research and Development Support plays the same role at present. State programmes of research and development have their specific roles in compliance with Act 172/2005, with orientation to the most important priorities of economical and social development. Incorporation of non profit and business sectors into R&D field should be needed in accordance with art. 23, section 4 of Act No. 172/2005 on organisation of state support to the research and development.

Art. 11 of the Stockholm Convention forms a basis for research and development in POPs issues, as the parties should support and perform appropriate research and development in issues like e.g.:

- characterisation of POPs, their transformation and irreversible transformation,
- elimination of POPs release to the environment,
- alternatives of POPs,
- movement in the environment,
- effects on human health and the environment,
- harmonised methodologies for making inventories of generating sources and analytical techniques for the measurement of releases.

According to the art. 8 of the Stockholm Convention on POPs a co-ordination with Evaluation Committee on POPs is needed. This Committee was established in order to co-ordinate the activities in the issues of categorisation of additional chemicals among POPs in compliance with the requirements stated in Annexes D and E of the Stockholm Convention on POPs.

Also the article 9 of the Regulation (EC) No. 850/2004 on POPs is important, as it requires elaboration of appropriate programmes and mechanisms reflecting the up-to-date technical

status, while in accordance to art. 6(2) of this Regulation measures should be elaborated that will support development of application of alternative or modified materials, products or technological procedures that will prevent creation and release of POPs into the environment.
In accordance to the art. 6(3) of this Regulation, alternative procedures, technologies and practices should be supported – being also a field for science and technological research.
According to the art. 7(7) of this Regulation, the limit concentration values for POPs in wastes will be re-evaluated till 31 December 2009, in order to ensure environmentally sound handling with POPs wastes, i.e. wastes comprising POPs, containing POPs or wastes contaminated by POPs. The international technical development would serve as a basis for this re-evaluation.

The support to the research and development issues is needed also in relation to the activities of „IPPC Working Group" established in the framework of co-operation with the Association of Industrial Unions in SR in order to implement Act No. 245/2003 Coll. on IPPC .

Tools for POPs projects implementation are:
- use of existing system in Slovakia, through ASST (including of POPs among priorities of state R&D program)
- participation of SR in the 6. Framework Program for Science and Technology EU and other forms of international co-operation

The mid-term outlooks of the investigated research institutions show clearly that the actual targets should be reached by national and foreign research projects, by participation on the programmes approved by Slovak government or by involvement into the activities of international organisations, mostly EU.

## MONITORING

### Setting of priorities

Based on the analyses of requirements of the Stockholm Convention, overview of POPs monitoring results as well as agreed setting priorities, the following measures has been measures:

1. **Establishment of a POPs monitoring working group**
2. **Processing of a methodology for unified system of POPs monitoring on national level**
3. **Securing execution and coordination of monitoring according to a plan prepared on national level**
4. **Analysis of the methodologies and securing coordination of laboratories for use of sufficiently precise and selective analytical methods**
5. **Securing the information flow between institutions responsible for monitoring and the institution/s responsible for reporting**
6. **Making the monitoring results accessible to expert and general public in sufficiently intelligible form**
7. **Supporting the research in areas related to design and operation of monitoring on national and international level**

The proposed priorities are elaborated in more detail in the following text. Each chapter ends with a table containing the proposed activities (column 1) in order to meet the requested

outputs (column 2) the assumed timeframe (column 3), proposed institution/body responsible for the implementation (column 4) and a reference to further details and annexes of the NIP (column 5).

**Proposed measures**

## 1. Establishment of POPs monitoring working group

As the monitoring programmes are performed by multiple institutions under responsibility of ministries of environment, agriculture and health care, it is necessary to ensure an effective communication and co-operation between the individual institutions. It would be necessary to establish a working group under ME as a responsible body for the Stockholm Convention implementation. The working group members will be nominated from experts in monitoring, as appointed by the institutions. The working group will be concentrated in ensurance of elaboration of harmonised system of POPs monitoring in SR territory.

Working group will be created in three steps. First, an agreement will be negotiated between ME SR, Ministry of Agriculture and Ministry of Health on establishment of a working group. The ministries would then appoint the members to this group by means of the institutions performing the partial monitoring programmes. It would be appropriate to cover the individual monitored matrices by and „umbrella" body.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| ***1*** | ***Establishment of POPs monitoring working group*** | | | | |
| 1.1 | Negotiation between ministries in order to agree on working group establishment and definition of its tasks and responsibilities | Agreement on establishment of working group | June 06 | ME SR | |
| 1.2 | Nomination of experts from involved institutions | List of working group members | July 06 – August 06 | ME SR | |
| 1.3 | Working group activities start | Initial session | September 06 | ME SR | |

## 2. Elaboration of strategy on harmonised POPs monitoring system on national level

Elaboration of strategy for harmonised POPs monitoring will be delegated to the working group on monitoring. Existing monitoring programmes should be taken into consideration, they could be improved or complemented as necessary in order to ensure availability of necessary information for reporting to COP and EC. Harmonised POPs monitoring programme therefore should not be understood as a separate monitoring programme, but rather as integration of systematic data gathering and data evaluation of existing partial monitoring systems. In addition to the basic characteristics of monitoring (sampling site, range of parameters, monitoring frequency) it will be necessary to define form and system of reporting of results to contact point for the Stockholm Convention.

Strategy elaboration will be performed in three steps. First, analysis of Convention and Regulation (EC) 850/2004 on POPs on monitoring of each relevant matrix will be done. POPs

investigation analysis in the framework of existing monitoring schemes will be done. Comparison of results of these analyses will define activities needed for harmonisation of existing monitoring programmes and the requirements of the Convention and Regulation (EC) 850/2004 on POPs. In the proposal of activities it will be necessary to take into consideration also the monitoring results presented in the Technical Report No. 2, elaborated in the framework of project "*Initial Assistance to the Slovak Republic to Meet its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)"*.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| ***2*** | ***To elaborate harmonised system of POPs monitoring on national level*** | | | | |
| 2.1 | Elaborate analysis of Stockholm Convention requirements and EPR Regulation on monitoring | Definition of information requirements for monitoring | October 06 | WG-M | |
| 2.2 | Update analysis of POPs investigation under existing monitoring programmes | Overview of monitoring in individual matrices | November 06 - December 06 | Monitoring operator | |
| 2.3 | Define activities needed for harmonisation of existing monitoring programmes and requirements of the Stockholm Convention and Regulation (ES) No. 850/2004 on POPs | Strategy | January 07 – June 07 | WG-M | |

## 3. To ensure monitoring based on the elaborated national plan

Organisations that perform monitoring activities will update their monitoring programmes according to the elaborated strategy. It will be necessary to identify sampling sites network where POPs will be observed. It is foreseen that the existing monitoring networks would not be necessarily broadened by new observation sites to an important extent. Moreover, it will be needed to define the set of parameters in each monitoring programme and each sampling site, as well as to set the observation frequency.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| ***3*** | ***To ensure monitoring based on elaborated national plan*** | | | | |
| 3.1 | Identification/update of monitoring networks | Report – monitoring programme | July 07 – December 07 | Monitoring operators | |
| 3.2 | Definition of investigated parameters | Report – monitoring programme | July 07 – September 07 | Monitoring operators | |
| 3.3 | Definition of sampling time | Report – monitoring programme | September 07 – December 07 | Monitoring operators | |

## 4. To check methods and to ensure co-ordination of laboratories in order to use sufficiently precise and selective analytical methods

**The results of complementary monitoring of organo-chlorine pesticides (OCPs) in sediments elaborated under the project** "Initial Assistance to the Slovak Republic to Meet

its Obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)" **shown that after application of a single non-selective method – e.g. GC-ECD – the representative of OCPs would be measured incorrectly in nearly all samples containing also other chlorinated substances. A typical examples originated from Chemko Strážske vicinity where high concentrations of PCBs were clearly present, as well as other chlorinated substances that resulted in release of false signal in targeted OCP analysis.**

It will be necessary to check selectivity of routinely used OCP measurement methods in co-operation with the National Reference Centre for POPs (NRC-POPs), and also to elaborate a list of recommended methods for identification of individual chemical substances belonging to POPs group. Conditions need to be created, so that the organisations performing analyses of these substances will have a possibility to confirm the measurement preciseness by ring tests – using high concentrations of other chlorinated substances in reference samples. NRC-POPs will organise such ring tests, or National Reference Laboratories under its methodological supervision.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| ***4*** | ***To check methods and ensure co-ordination of laboratories for using of sufficiently precise and selective analytical methods*** | | | | |
| 4.1 | Check of selectivity of routinely used methods of OCPs detection in presence of other organic substances | Evaluation report | January 07 – September 07 | NRC-POPs | |
| 4.2 | Elaboration of list of recommended detection methods for OCPs | List of recommended methods | October 07 | NRC-POPs | |
| 4.3 | Organisation of ring tests | Presence of laboratories in ring tests | November 07 | NRC-POPs, NRL | |
| 4.4 | Evaluation of selectivity of used OCP measurement methods | Certificate of successful participation in ring test | December 07 | Laboratories | |

## 5. To ensure information exchange between institutions responsible for monitoring and body / bodies responsible for reporting

The actual monitoring system in SR was developed for individual evaluation of monitored matrices, and it was based on the specific requirements for the individual field. This background led to appearance of separate and incompatible procedures of results evaluation. Results of the individual monitoring systems are obviously evaluated in separate yearly reports or specific publications.

In order to allow proper reporting it will be necessary to ensure that aggregated data will be delivered to contact point for the Stockholm Convention in precisely defined format. When evaluating the group parameters (PCB, PAH, PCDD/PCDF, HCH) it will be needed to define unambiguously which individual compounds will be comprised. Moreover, it will be necessary to harmonise to maximal applicable extent the units for expression of individual monitoring programmes. Also the requirements of other international conventions should be taken into consideration in solving this issue.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| ***5*** | ***To ensure information exchange between institutions responsible for monitoring and body / bodies responsible for reporting*** | | | | |
| 5.1 | Definition of format of reporting | Report, reporting sheets | June 07 – August 07 | PS-M | |
| 5.2 | Elaboration of reporting plan and time schedule | Report | September 07 | PS-M | |

### *6. To ensure accessibility of monitoring results to broad expert and layman's publics in understandable form*

The actual system of accessibility of monitoring results is dedicated mostly to experts. The Stockholm Convention commits the parties to endeavour increased public awareness on POPs. Thus, it is appropriate to present monitoring results not only in routine table form, but also in maps.

A strong and valuable tool for creation of maps can be based on GIS technologies. These technologies are probably available to all institutions responsible for monitoring at present. It will be necessary to ensure that GIS outputs will become a standard part of monitoring result presentation on national level. These results should be shown in addition to the print media also by Internet. Creation of information web page on POPs issues should be a best alternative and it could be operated by the National Contact Point for the Stockholm Convention.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| ***6*** | ***To make monitoring results accessible to laymans publics in understandable form*** | | | | |
| 6.1 | Creation / upgrade of GIS applications | Maps | January 08 – ongoing | Monitoring operators | |
| 6.2 | Creation of information portal on POPs | web page | July 06 – December 07 | National contact point | |

### *7. To support research in selected issues*

Only a few information is available on unintentionally produced POPs content in environmental matrices and human population in vicinity of their potential sources at present (pursuant to the Stockholm Convention).

Therefore it is proposed to support research in the following issues:

1. PCDD/PCDF content in free atmosphere in sites with extensive solid fuels incineration for household heating,
2. Monitoring of WWTP sludges – transport of POPs in the environment, their fate and possible transformation,
3. Mapping of contaminated sites and identification of pollution extent,
4. POPs appearance in biological materials.

Agency for Research and Development Support is a standard tool for these issues.

| | *Activity / action* | *Requested output / indicator of success* | *Timeframe* | *Responsible institution/ body/sector* | *Note* |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| ***7*** | ***To support basic and applied research*** | | | | |
| 7.1 | Elaborate and publish a call for project proposals | Call for proposals to expert organisations | January 07 | Agency for Research and Development Support | |
| 7.2 | Project selection | List of projects, project documents | July 07 – December 07 | Agency for Research and Development Support | |
| 7.3 | Implementation of research projects | Evaluation reports | January 08 – ongoing | Expert organisations | |

## Time and financial plan

Activities: Monitoring in total amount 7.625 mill. Sk – costs related to change of existing monitoring – introduction of new methods and procedures for evaluation including regular application.
Such elaborated existing monitoring will require additional yearly expenses in amount 1 mill. SK, starting by year 2007.

When estimating this type of expenses, the hourly work price and working place are considered. Different work power prices are taken into consideration by the individual years of evaluated time horizon in relation to the increased workload prices. Different work price for special performances is considered. The price for a workplace is also different according to the requested technical outfit.

Financial coverage of the total costs for this activity is foreseen from the state budget for the corresponding fiscal year in the chapter of Ministry of Environment.

In the framework of NIP elaboration supporting project under GEF during year 2004 the cost estimate was performed which is shown in Annex 1, entitled 3.3.2 (l) Activity: Cost estimate of activity 3.3.2 (l) Research, development and monitoring.

### 3.3.2 (l) Activity: Information exchange and stakeholders involvement

**Setting of priorities**

Based upon the Stockholm Convention requirements, overview of current POPs reporting mechanism in Slovakia, as well as agreed criteria for priority setting, following measures have been defined:

**1. To establish a National Focal Point (NFP-POPs)**

**2. To introduce an effective system for provision of information by responsible institutions to the National Focal Point.**

**3. To introduce an effective system for provision of information on actual POPs compounds imports and exports on institutional level between stakeholders and NFP**

**4. To introduce an effective system for provision of information on handling with POPs-pesticides after their expiry period.**

**5. To introduce an effective system of provision of information on appearance and handling with POPs containing dangerous wastes, their import and export to NFP**

**6. To introduce an effective system of provision of information on contaminated equipment and their gradual elimination to NFP**

**7. To introduce an effective system of provision of information on production of chemicals and gradual elimination of POPs or similar compounds to NFP**

**8. To introduce an effective system of provision of information on usage of chemical preparations and products containing HCB (except of plant protection preparations)**

Further text describes these priorities in greater detail. A table is listed at the end of each chapter, which contains proposed activities (Column 1), required outputs/indicator of fulfilment (Col. 2), estimated time horizon (3), proposed responsible institution/body (4), and a note (5) with reference to further details and NIP Annexes.

**Proposed measures**

***1. To establish a National Focal Point (NFP-POPs)***

Analysis of current situation in the institutions that record or hold information on some POPs, shows that there is no system sufficient for comprehensive POPs data collection.

As a part of its international commitments such as *'Basel Convention on regulation of transboundary transfer of hazardous wastes and their disposal'*, and *'Protocol on POPs to the Convention on Long-Range Transboundary Air Pollution'* (POPs protocol), Slovak Republic regularly reports to international organisations via existing contact focal points. These are National Focal Point to the SEA for the Basel Convention and relevant institutions of the ME SR for the POPs Protocol.

In terms of the above facts, we recommend to establish a National Focal Point on POPs pursuant to Art. 9 of the Stockholm Convention. Due to the sufficient experience of existing contact points for other conventions we recommend to build the focal point for POPs on those points.
COP 1 approved a format for reporting in May 2005 (www.pops.int, POPRC – 1 Report) that is split into two basic sections. Section A contains overall information on the submitted report, section B presents implemented measures for Stockholm Convention application and their effectiveness.
NFP-POPs is obliged to submit reports to Stockholm Convention secretariat in electronic as well as hard copy formats regularly each four years. The first report should be submitted till December 31, 2006. The results will be presented on COP 3.
NFP-POPs role is to secure information exchange, reporting to the secretariat and COP, as well as elaboration of partial information from the national contact points and other expert institutions handling POPs data – e.g. SEA, SHMI, CAITI etc.

## 1.1 Negotiation on ministerial level

It will be necessary to organise a meeting of involved ministries in order to agree on establishment of the NFP-POPs. This meeting will be called by the Ministry of Environment SR, as the body responsible for the implementation of Stockholm Convention in Slovakia. The purpose of this meeting will be an analysis of technical, organisational and personal issues of NFP, or project proposal that should solve the necessary issues.

## 1.2 Personal and technical support, training of NFP personnel

In order to increase the responsibility of the selected workplace that will play a role of NFP, it will be necessary to secure its personal and technical strengthening. The employees of NFP should pass training organised by ME SR in order to fulfil the tasks resulting from the Stockholm Convention.

## 1.3 NFP-POPs web page creation

Web page should be created as a tool for information spread on activities and outputs of NFP and as an information resource for broad expert as well as layman public. The web page should be updated regularly.

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution /ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **1.** | ***To establish a National Focal Point (NFP-POPs)*** | | | | |
| 1.1 | Talks between the ministries with the purpose of NFP-POPs establishment | NFP-POPs with its statute | April – May 2006– | ME SR | |
| 1.2 | Establishment of NFP-POPs – personnel and technical equipment, training, and its operation | Start of NFP-POPs' operation | November – December 2006 | ME SR | |
| 1.3 | Establishment and operation of NFP-POPs web page | WWW portal NFP-POPs – information on NFP-POPs activities | December 2006 | NFP-POPs | |

## *2. To introduce an effective system for provision of information by responsible institutions to the National Focal Point*

### 2.1 Negotiation on ministerial level

For the purposes of preparation of reports on POPs production, use, imports, exports, storage and emissions will NFP-POPs receive partial information from the institutions having information on POPs. It is therefore imperative to legally establish the duty of responsible institutions to NFP-POPs. This is to be done by mutual agreement reached on a meeting of all involved ministries.

### 2.2 Creation of information exchange mechanism

During elaboration of comprehensive report NFP will co-operate with expert institutions handling POPs data. In order to fulfil effectively the requirements of Art. 15 of the Stockholm Convention it is necessary to elaborate Methodology for reporting that will solve mechanism of data exchange between individual institutions.
Specification of responsibilities of the individual institutions in the reporting process will form this methodology as required by the Stockholm Convention:

a. Real POPs production, import and export
b. POPs usage, obsolete POPs containing plant protection preparations
c. Production, import and export of POPs containing wastes
d. Unintended POPs production and
e. PCB contaminated equipment.

This methodology should be accessible for each involved institution in order to facilitate their own performance and elaboration of time plan and update of their existing databases.

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution/ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***2.*** | ***To introduce an effective system for provision of information by responsible institutions to the National Focal Point*** | | | | |
| 2.1 | Discussions between ministries | Mandate to the responsible institutions for cooperation with NFP-POPs | August 06 | ME SR | |
| 2.2 | Elaboration of mechanism for provision of information on:<br>a. Real POPs production, import and export<br>b. POPs usage, obsolete POPs containing plant protection preparations<br>c. Production, import and export of POPs containing wastes<br>d. Unintended POPs production and<br>e. PCB contaminated equipment. | Methodologies on provision of information on POPs /NFP-POPs | August 06 – December 06 | NFP-POPs | |

### *3. To introduce an effective system of information submission on actual POPs import / export between stakeholders and NFP- POPs.*

Due to absence of unified recording of import / export of chemicals on ST territory it is necessary to introduce measures that will secure an overview of real amounts of imported / exported amounts of those substances on Slovak market. For information delivery on import / export of chemicals to NFP it is necessary to create a responsible body for direct submission of data to NFP in compliance with Art. 15 of the Stockholm Convention (in co-operation of Ministry of Economy and Custom Directorate), as described in Chapter 3.3.1 (c), in parallel with definition of format for data delivery.

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution/ ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **3.** | ***To introduce an effective system of information submission on actual POPs import / export between stakeholders and NFP*** | | | | |
| 3.1 | Negotiation between Min. of Economy and Custom Directorate, necessary legislation upgrade | Appointed institution directly delivering data on POPs to NFP according to the legislation | Linked to relevant EC legislation on transport of dangerous substances | ME SR, MEcon SR | |
| 3.2 | Definition of format for provision of information on actual quantities of imported and exported POPs to the NFP-POPs | Standard format (methodology) for provision of information on POPs exports and imports to the NFP-POPs | Linked to relevant EC legislation on transport of dangerous substances | Responsible institution | |

### 4. *To introduce an effective system for information delivery to NFP on POPs obsolete pesticides handling*

Control of amounts and disposal of POPs pesticides including obsolete POPs pesticides stockpiles is performed by CAITI – phytoinspectors. Therefore it is recommended that Ministry of Economy will charge CAITI (or phytoinspectors) to ensure during the regular checks also the control of destructed obsolete POPs pesticides, in order to compare them with existing lists of inventoried obsolete POPs pesticides (more details in Chapter 3.1.1).

SEA CWEM Bratislava as an institution empowered to perform the regional information system on waste (RISO) records and processes the data on appearance and handling with waste. In spite of that it is not possible to identify POPs pesticide wastes in RISO that are considered to be a waste when becoming obsolete.

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution /Ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |

| | | | | | |
|---|---|---|---|---|---|
| **4.** | ***To introduce an effective system for information delivery to NFP on POPs obsolete pesticides handling*** | | | | |
| 4.1 | Modification of the existing mechanism for registration of obsolete POPs plant protection preparations stockpiles and facilitation of provision of information to the NFP-POPs | Modified registration system | July 06-August 06 | CAITI | |
| 4.2 | Definition of format for provision of information on obsolete POPs plant protection preparations stockpiles in Slovakia | Standard format for provision of information on obsolete POPs plant protection preparations stockpiles to the NFP-POPs | September 06 | CAITI | |

### *5. To introduce an effective system for information delivery on appearance and handling with POPs containing wastes, their import /export to NFP*

Reporting system for Basel Convention requirements fulfilment exists on waste import / export, where Slovak Environmental Agency is a responsible body – CWEM Bratislava (National Focal Point for Basel Convention). CWEM also operates Regional Information System on Waste (RISO) that follows production of wastes and their handling in Slovak territory.

Absence of codes of the individual POPs wastes creates a basic problem in recording of waste production and handling - they do exist only for PCB, as well as different coding of waste intended for export or import (details in Chapter 2.3.5).

In order to provide information on POPs containing wastes it is necessary to improve existing legislation requirements and to specify the codes for individual POPs containing wastes, in parallel with their incorporation according to waste register into the Red List of Waste (for recording of their import / export).

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution /ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **5.** | ***To introduce an effective system for information delivery on appearance and handling with POPs containing wastes, their import /export to NFP*** | | | | |
| 5.1 | Modification of the legislative requirements for effective tracking of POPs containing waste | Update of Decree ME SR 284/2001 Coll. on Waste Register and ME SR Decree 234/2001 | July 06-January 07 | ME SR | |
| 5.2 | Modification of existing system for waste registration in SR in order to facilitate information delivery on handling, import and export of POPs containing waste to NFP | Updated system of POPs import / export registration | July 2006 – September 2006 | SEA | |
| 5.3 | Definition of format for provision of information on POPs | Standard format for provision of information on wastes | September 06 | SEA | |

### *6. To introduce an effective system for information provision on contaminated equipment and their gradual phase-out in SR to NFP*

SR has legislative ensurance of usage control of contaminated equipment since their destruction by means of appointed organisation – SEA CWEM Bratislava that is responsible for managing and updating of contaminated equipment database.

SEA CWEM Bratislava is responsible for reporting on contaminated equipment and PCB content as result of obligations pursuant from Art. 4 of Council Directive 96/59/EC on PCB/PCT destruction, which is fully implemented by corresponding national legislation (Act No. 24/2004 Coll.).

In the framework of effective data reporting from the list of contaminated areas to NFP it is recommended to adjust the existing system of registering and to define the format of outputs for NFP reporting.

Reporting system on POPs usage is absent in SR at present. The legislation restricts the PCB and HCB usage by Ministry of Economy decree No. 67/2002 Coll.

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution /ministry/ body* | *Note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| **6.** | ***To introduce an effective system for information provision on contaminated equipment and their gradual phase-out in SR to NFP*** | | | | |
| 6.1 | Modification of current mechanism of registering of PCB contaminated equipment | Improved registration system | July 06 - September 06 | SEA | |
| 6.3 | Definition of format for provision of information on PCB containing equipment in SR | Standard format for provision of information on PCB containing equipment to the NFP | September 06 | SEA | |

### *7. To introduce an effective system of chemical production information provision to NFP, with the aim to eliminate production of POPs or chemicals with POPs properties in Slovakia.*

As there are no POPs currently produced in Slovakia, there is also no system for reporting their production.

However, it should be noted that POPs production is not prohibited by law. This means that during the environmental impact assessment process (Act No. 127/1994 Coll. on environmental impact assessment as amended) by prepared constructions, equipment and other activities (e. g. complex equipment for industrial production of chemicals for halogen hydrocarbons production, etc.), public bodies responsible for giving out the permission have no legal authority to prohibit production of POPs or POPs-like chemicals. Also because of

this fact we may state that no production of banned POPs or POPs-like compounds was recently permitted in Slovakia.

In spite of the above mentioned situation, a system for targeted control of chemical enterprises for elimination of POPs compounds is needed. The competent organisation for chemical production control would be Slovak Environmental Inspectorate. SEI would write a report on POPs production (or rather non-production) to the NFP-POPs. It will be necessary to authorise SEI to carry out this control and to create the control procedure and time schedule.

Despite of POPs production absence in SR it will be further necessary to create a standard format for provision of information on potential POPs production to NFP-POPs

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution /ministry/ body* | *note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***7.*** | ***To introduce an effective system of chemical production information provision to NFP, with the aim to eliminate production of POPs or chemicals with POPs properties in Slovakia*** | | | | |
| 7.1 | Empowerment to SEI for targetted control of elimination of POPs production in SR | Empowerment and definition of time schedule and control procedures | July 2006 | ME | |
| 7.2 | Implementation of the control of chemical enterprises | Evaluation report on production of POPs in Slovakia | August 06 – September 06 | SEI | |
| 7.3 | Definition of a format for provision of information on POPs production (non-production) in Slovakia | Standard format for provision of information on POPs production (non-production) in Slovakia | September 06 | SEI | |

### *8. To introduce effective system of information provision on usage of chemicals and chemical products containing HCB (excluding plant-protecting preparations)*

POPs usage reporting system does not exist in SR at present. Legislation restricts PCB and HCB usage (decree of Ministry of Economy 67/2002 Coll.). Due to the fact that SR did not asked for registration of any exception in compliance with Art. 4 of the Stockholm Convention, full ban of production and usage of HCB is in force.

Mechanism for monitoring of HCB (excluding plant-protecting preparations) use in Slovakia does not exist.

Due to the above facts it is necessary to ensure control of usage of those preparations in SR by means of bodies (Public Health Institutes, Slovak Trade Inspectorate) responsible for chemicals control – not containing HCB according to the Act No. 163/2001 Coll. After performance of control the responsible bodies will elaborate a report on usage of chemical preparations and products containing HCB in SR that will be delivered to NFP.

It is also necessary to ensure control of cosmetic products in SR by responsible control bodies (Public Health Institutes), as they should not contain HCB in compliance with Slovak government decree No. 658/2005 Coll. that sets out the requirements for cosmetic products as well as Slovak Trade Inspectorate for control purposes.

| | *Activity* | *Required output/ Indicator of success* | *Time horizon* | *Responsible institution /ministry /body* | *note* |
|---|---|---|---|---|---|
| *0* | *1* | *2* | *3* | *4* | *5* |
| ***8.*** | ***To introduce effective system of information provision on usage of chemicals and chemical products containing HCB (excluding plant-protecting preparations)*** | | | | |
| 8.1 | Authorisation of PHO and STI to carry out control the HCB presence | Authorisation and defined time schedule and control procedure | July 06 | MH SR MEcon SR | |
| 8.2 | Control performance | Evaluation report on the appearance of HCB-containing preparations in Slovakia. | August 06 – September 06 | STI, PHI | |
| 8.3 | Definition of format for provision of information on the HCB-containing preparations use. | Standard format for provision of information on the HCB-containing preparations use to the NFP-POPs. | September 06 | STI, PHI | |

## Time and financial plan

The same principles were used for estimates of costs of this action plan as in the action plan: Monitoring. Total costs of creating the reporting and information exchange system will be 2.5 mil. SKK. Costs of the office equipment will be 400 000 SKK. Costs of continuous reporting and information exchange are estimated to be 150 000,- SKK yearly, including the maintenance of specialised web page. These costs total to about 790 000,- SKK during the considered period.

Financing of these costs is expected to come from the state budget in each relevant year, from the chapter of the Ministry of Environment SR.

In the framework of NIP elaboration supporting project under GEF during year 2004 the cost estimate was performed which is shown in Annex 1, entitled 3.3.2 (l) Activity: Cost estimate of activity 3.3.2 (l) Information exchange and stakeholders involvement.

### 3.3.3 (m) Activity: Financial and technical assistance

In the framework of EU funds absorption (technical assistance of operation programme Basic Infrastructure financed by European Fund for Regional Development, oriented also to support preparation and implementation of strategies and projects) a project entitled „Support to preparation and implementation of strategies and projects in the POPs issues for years 2007 – 2013“ is prepared. This project is needed as SR is in the initial phase of Stockholm Convention implementation and SR has to meet the obligations of this convention.
The particular aims are as follows:

1. abandoned production and use of POPs enlisted (aldrine, chlordane, dieldrine, endrine, heptachlor, hexachlorbenzene, mirex, toxaphene and PCB),
2. ban or restrictions of export and import of these substances,
3. measures for reduction of total amount of enlisted unintentionally produced POPs (PCDD/F, HCB and PCB) in order to steadily decrease their releases from listed sources,
4. ensurance of environmentally sound handling of POPs wastes.

As some particular measures should be proposed in order to decrease releases of unintentionally produced POPs from quite broad range of equipment, team co-operation of experts from different fields is necessary. This co-operation should be achieved thank to the above mentioned project.

The management issues touch a broad range of national economy sectors. Thus, application of individual measures in the framework of National Implementation Plan will be realised by projects requiring financial support from EU resources under National Strategic Reference Framework managed by Ministry of Regional Development.

Elaboration of background document for precise definition and detailed elaboration of operation programme targeting new financial perspective of years 2007 - 2013 in the field of waste management is foreseen (activities related to POPs), as well as setting out monitoring indicators in this measure. The financial support will be needed for the following actions:

- estimate of impacts to public financial resources, to the environment, employment and business milieu,
- supporting projects on WWTP sludges and bottom sediments containing POPs,
- improvement of monitoring system on POPs according to EU requirements,
- support to BAT implementation required by the Stockholm Convention,
- separated POPs waste collection as a part of environmentally sound waste handling,
- supporting projects on POPs pesticides and PCB,
- decontamination of sites polluted by POPs.

The above mentioned project is aimed in creation of legislative background, capacity resource and technical infrastructure that will allow (on the basis of monitoring and evaluation) to reach favourable development in POPs issues, and it will also serve for preparation of decision making procedures and investment strategies development, including selection of priority projects. Long term strategic process of improvement in POPs management issues will be

started, and it will result in decreased negative impacts of POPs to the environment in the framework of new financial EU perspective of years 2007 - 2013.

### 3.3.3 (n) Activity: Reporting

Reporting obligations will be met by SR in relation to art. 12 of Regulation (EC) 850/2004 on POPs, giving to the member states the following obligations:

- to report statistical data on a yearly basis on the real or estimated total production volume and market introduction of each substance listed in Annex I (aldrine, chlordane, dieldrine, endrine, heptachlor, hexachlorbenzene, mirex, toxaphene, PCB, DDT, chlordecon, hexabromobiphenyl and HCH) or II of this Regulation,
- to report data each three years on the following:
    - stockpiles of these substances in amounts exceeding 50 kg,
    - releases of PCDD/F, HCB, PCB and PAU,
    - presence of PCDD/F and PCB in the environment, resulting from art. 9 of this Regulation on monitoring and linked to appropriate programmes and mechanisms corresponding to best available techniques for submission of comparable data, that will be elaborated by EC and EU member states in close co-operation with Stockholm Convention secretariat.

### 3.3.3 (o) Activity: Effectiveness evaluation

SR will join effectiveness assessment pursuant to art. 6 of the Stockholm Convention in compliance with guidelines for this issue that will be elaborated by individual EU institutions.

SR is making appropriate efforts at present in order to involve Slovak experts into preparation of procedures and institutional mechanisms of non-compliance of convention obligations and of handling of parties who were found to breach their obligations.

Slovak Environmental Agency was charged to perform National Focal Point activities in relation to art. 9 and 15 of the Stockholm Convention

SR will report to the Conference of Parties on the measures adopted for implementation of convention obligations as well as on effectiveness of these measures in respecting the convention targets.

### 3.3.3 (p) Activity: Listing of further chemicals in the Convention

SR is actively involved in electronic discussion on the individual proposals for amending the lists of substances in Annexes A, B and C in accordance with art. 8 of the Stockholm Convention, in the framework of co-operation of scientific institutions throughout EU.

SR will attempt to co-operate actively with Assessment Committee for POPs that has been established by COP-1 to the Stockholm Convention according to art. 2 section 8 of this Convention.

## *3.4 Institutional and Regulatory Strengthening Measures*

Particular measures for institutional and regulatory strengthening will be done in the framework of allocation proposal for this plan (till 2025) that will be developed in a separate document. This document will be submitted to SR government session in relation to priority problems requiring appropriate capacity building of institutions dealing with POPs issues, e.g. Centre for Chemical Substances and Preparations, Public Health Institutes, Central Agricultural Control and Testing Institute, State Veterinary and Food Inst., Food Research Inst., Slovak Hydrometeorological Inst., Slovak Environmental Agency, Slovak Environmental Inspectorate, State Energetic Inspectorate, Research Inst. for Agriculture and Soil Protection, Water Research Institute, Slovak Technical University and Slovak Health University.

Capacity and regulatory strengthening is unavoidable in the fields like ensurance of compatibility of relevant legislative acts in relation to EEC, UN and international agreements, in parallel with EU legislation, international co-operation in harmonisation of procedures and mechanisms for assessment of effectiveness and non-compliance, joining of global initiatives towards implementation of uniform monitoring and reporting in POPs issues and elaboration of harmonised methodology for NIP updating in the future.
Expert co-operation of persons preparing the basis for environmentally sound handling of POPs waste is extremely important, in close relationship with experts preparing manuals for environmentally sound management of these wastes under Basel Convention agenda, as well as Rotterdam Convention agenda.

Sufficient capacities are necessary also for the process of gradual implementation of best available techniques and best environmental procedures related to ensurance of reduced releases of unintentionally produced POPs, in close link with international technical development and research in substitute chemicals.

Capacity support is also required in co-ordination of activities of assessment of new chemicals from their persistence point of view, and introduction of procedures of amendment of POPs lists in Stockholm Convention annexes.

Moreover, strengthened capacities are expected in PCB and PCB containing wastes destruction by environmentally sound manner, destruction of POPs pesticide stockpiles („historical burden on SR territory“– result of socialistic agriculture), PCB containing sediments decontamination from water recipients and surrounding soil as result of abandoned PCB production in Chemko Strážske, and also investigative research of areas contaminated by PCBs and their decontamination.

## *3.5 Priorities*

The partial activities, as well as complex assessment of problems resulted in definition of SR priorities - Stockholm Convention implementation in order to protect human health and the environment against POPs effects requires the following:

1. appropriate capacity strengthening of institutions that are active in EEC and international agreements as well as EU requirements implementation in the following issues:
    a) ensurance of compatibility of relevant legal instruments
    b) implementation of harmonised procedures and institutional mechanisms for assessment of effectiveness and non-compliance
    c) introduction of harmonised monitoring and reporting
    d) support to gradual implementation of best techniques and best environment procedures for decreased releases of unintentionally produced POPs
    e) co-ordination of technical development and research in substitute chemicals
    f) assessment of new chemicals from their persistence point of view
    g) introduction of harmonised procedures of amendment of POPs lists in the Convention annexes
    h) elaboration of harmonised methodology for updating of NIPs to Stockholm Convention
    i) environmentally sound handling with POPs wastes, i.e. wastes comprising, containing or being contaminated by POPs by experts preparing manuals for environmentally sound management of these waste under Basel Convention agenda
    j) co-operation with experts involved in Rotterdam Convention agenda

2. destruction of PCB and PCB containing wastes by environmentally sound manner,

3. destruction of obsolete POPs pesticide stockpiles appearing on SR territory as „historical waste“ resulting from socialistic agriculture in the past,

4. decontamination of PCB containing sediments from recipients and surrounding soil as result of abandoned PCB production in Chemko Strážske,

5. investigative research of POPs contaminated areas and their decontamination,

6. raising of public environmental awareness,

7. research and development in POPs management issues.

## *3.6 Timetable for National Plan Implementation and Measures of Success*

The particular time plans are proposed directly in the individual chapters of NIP and their finalisation will be secured as a part of allocation proposal to this plan till 2025 that will be developed as a separate document that will be submitted to SR government session. Specification of stepwise measures will be based on the priority problems requiring solution.

Appropriate institutional capacity strengthening seems to be unavoidable, as these institutions are necessary in the issues like ensurance of compatibility of legal acts to EEC, UN and international agreements plus EU legislation, international co-operation in introduction of harmonised procedures and institutional mechanisms for evaluation of effectiveness and non-compliance, as well as joining the global initiatives towards implementation of harmonised monitoring and reporting in POPs issues and elaboration of unified methodology for updating of NIPs to Stockholm Convention in the future.

Expert co-operation of persons preparing the basic necessities for environmentally sound handling of POPs waste is extremely important, in close relationship with experts preparing manuals for environmentally sound management of these wastes under Basel Convention agenda, as well as Rotterdam Convention agenda.

Stockholm Convention implementation is unavoidably linked to support of stepwise introduction of best techniques and best environmental procedures for reduced releases of unintentionally produced POPs in relation to international technical development and research of potential substitutes.

Co-ordination of activities in assessment of new chemicals as regards their persistence is also very important, as well as introduction of unified procedures for amendment of POPs lists in Stockholm Convention annexes.

Specification of activities like PCB and PCB containing waste destruction by environmentally sound procedures, destruction of obsolete POPs pesticide stockpiles („historical waste“ on SR territory), PCB containing sediments decontamination from recipients and surrounding soil, investigation of POPs contaminated areas and their decontamination, in parallel with implementation time frame and stepwise measures will be elaborated in relation to Investment Strategy for Elimination of Environmental Burdens in SR which is co-ordinated by Division of Geology and Natural Resources of ME SR.

Activities belonging under public awareness raising will be specified in relation to Environmental Education Conception and to National Plan for Education, co-ordinated by Department for Public Relations ME SR.

Specification in the field of POPs research and development will be based on separate sub-programme of State Plan of Research and Development in relation to art. 23 section 4 of Act 172/2005 Coll. on organisation of state support to research and development amended by Act 575/2006 Coll.

## *3.7 Resource Requirements*

As the realisation of National Implementation Plan of the Stockholm Convention deals with quite broad range of issues under different sectors, financial allocations proposal for this plan for period till 2025 will be developed in a separate document submitted to SR government session individually.
The recent activities form a good prerequisite to positive impact to population, as well as improved quality of their lives mostly by means of strategic priority Human resources and

education under National Strategic Reference Framework for years 2007 - 2013, a basic document for financial support from EU funds - up-to-date education towards knowledge society in parallel with employment increase and social inclusion.
A positive impact is foreseen also in economy in business milieu and other legal subjects, mostly by strategic priority of the National Strategic Reference Framework for 2007 – 2013 - „Innovation, informatisation and knowledge economy“, as support to competitiveness of enterprises and services by innovation, informatisation, research and development is required also in POPs management issues.

Stockholm Convention National Implementation Plan will not have any negative environmental impacts on local, regional nor national levels as the Convention is aimed just at human health and environmental protection – in compliance with the targets of National Strategic Reference Framework for years 2007 – 2013: „Important increase of the competitiveness and effectiveness of regions and Slovak economy with respecting the sustainable development principles“.

The implementation of this plan falls under the strategic priority of National Strategic Reference Framework 2007 – 2013 „Infrastructure and regional availability“ and its specific priority environmental infrastructure and environmental protection, that should ensure environmental improvement as a strong basis for sustainable social and economical development of SR.

Due to the fact that in compliance with Integrated Approximation Strategy in the chapter Environment (2001) and EU Association Treaty, SR will invest to all environmental infrastructure sectors, also a basic framework for National Implementation Plan to the Stockholm Convention will be formed and the improved living conditions for the population will be reached.

In the framework of operation programmes financed by ERDF and Cohesion Funds, also strategic environmental assessment will be ensured in compliance with EP and Council No. 2001/42/ES on environmental impact assessment of certain plans and programmes – that is transposed into the actual SR legislation by Act No. 24/2005 Coll.

A positive impact is foreseen in the field of employment. Additional jobs will be created in POPs waste handling, research and investigation of POPs contaminated areas and their decontamination, as well as educational and research activities.

In the framework of proposed strategic and specific priorities of National Strategic Reference Framework 2007 – 2013 it is foreseen also a positive impact to entrepreneur milieu – „Innovation, informatisation and knowledge economy“, as research and development in POPs issues is also important for Stockholm Convention National Implementation Plan.

## *Glossary of abbreviations:*

| | |
|---|---|
| AC SR | Accreditation Commission SR |
| ACPI | Association of Chemical and Pharmaceutical Industry |
| AEO SR | Association of Employers' Organisations SR |
| AERI | Agricultural Economics Research Institute |
| APCI | Association of Paper and Cellulose Industry |
| APSN | Air Pollution Sources Nomenclature |
| ASST | Agency for Support of Science and Technology |
| BAT | Best Available Technology |
| BEP | Best Environmental Practice |
| BREF | BAT Reference Documents |
| CAITI | Central Agricultural Inspecting and Testing Institute |
| CCCP | Centre for Chemical Compounds and Preparations |
| CDST | Centre for Development, Science and Technology |
| CEE SR | Conception of Environmental Education in SR |
| CIMSE | Complex Information and Monitoring System for the Environment |
| CLRTAP | Convention on Long-Range Transboundary Air Pollution |
| CO | Consumer Organisations |
| DCP MI SR | Department of Civil Protection of the Ministry of Interior SR |
| DDT | 1,1,1,-trichloro -2,2, - bis (4-chlorfenyl) ethane |
| EC | European Commission |
| EEA | European Environmental Agency |
| EEC | European Economic Commission |
| EIA | Environmental Impact Assessment |
| EMAS | Environmental Management Systems |
| EPER | European Polluting Emissions Registry |
| E-PRTR | European Pollutant Release and Transfer Registry |
| EU | European Union |
| GIS | Geographic Information System |
| HCB | Hexachlorobenzene |
| IPCM | Institute of Preventive and Clinical Medicine (since 1.1.2004 Public Health Institute) |
| IPPC | Integrated Prevention and Pollution Control |
| IR | Integrated Information Registry |
| ISSRP SR | Information System for Scientific and Research Potential in SR |
| MA SR | Ministry of Agriculture SR |
| ME SR | Ministry of Environment SR |
| MEcon SR | Ministry of Economy SR |
| MEdu SR | Ministry of Education SR |
| MH SR | Ministry of Healthcare SR |
| MLSSF SR | Ministry of Labour, Social Security and Family SR |
| MTPT SR | Ministry of Transport, Post and Telecommunications SR |

| | |
|---|---|
| M-WG | Monitoring Working Group |
| NEIS | National Emission Inventory System |
| NFP-POPs | National Focal Point for POPs for Implementation of Stockholm Convention Requirements |
| NFR | New Format for Reporting |
| NGO | Non-government Organisations |
| NLI | National Labour Inspectorate |
| NPHE | National Program for Health and the Environment |
| NRL | National Reference Laboratory |
| PAH | Polycyclic Aromatic Hydrocarbons |
| PCBs | Polychlorinated Biphenyls |
| PCDD | Polychlorinated dibenzo-p-dioxins |
| PCDF | Polychlorinated dibenzofurans |
| PHI | Public Health Institute |
| POPs | Persistent Organic Pollutants |
| PVC | Polyvinyl chloride |
| RAPS | Registry of Air Pollution Sources |
| RCBC | Regional Centre for Basel Convention |
| RF | Recycling Fund |
| RWIS | Regional Waste Information System |
| SAS | Slovak Academy of Sciences |
| SCCP | Slovak Centre for Cleaner Production |
| SEA | Slovak Environmental Agency |
| SEA-CWEM | Slovak Environmental Agency, Centre of Waste and Environmental Management |
| SEI | Slovak Environmental Inspectorate |
| SHMI | Slovak Hydrometeorological Institute |
| SICAN | Slovak Information and Consulting Academic Network |
| SIS | State Information System |
| SISE | State Institute for Specialist Education |
| SNAS | Slovak National Accreditation Service |
| SOSR | Statistical Office SR |
| SPI SR | State Pedagogic Institute SR |
| STI | Slovak Trade Inspectorate |
| SVFA SR | State Veterinary and Foodstuff Administration SR |
| TEQ | Toxic Equivalent |
| TIC | Toxicological Information Centre |
| UNDP | United Nations Development Program |
| UNEP | United Nations Environmental Program |
| UNIDO | United Nations Industrial Development Organisation |
| UNO | United Nations Organisation |
| FRI | Foodstuff Research Institute |
| WEEE | Waste from Electric and Electronic Equipment |

| | |
|---|---|
| WMP | Waste Management Programs |
| WRI | Water Research Institute |
| WSHP | Work Safety and Health Protection |

# Annex I: Tables

3.3.1 (b) Activity: Cost estimate for activity 3.3.1 (b) Public awareness raising campaign

3.3.1 (i) Activity: Cost estimate for activity 3.3.1 (i) Identification and remediation of contaminated areas

3.3.2 (j) Activity: Cost estimated for activity 3.3.2 (j) Information exchange, education and public awareness rising

3.3.2 (k) Activity: Cost estimate of activity 3.3.2 (k) Research, development and monitoring

3.3.2 (l) Activity: Cost estimate of activity 3.3.2 (l) Information exchange and stakeholders involvement.

## *3.3.1 (b) Activity: Cost estimate for activity 3.3.1 (b) Public awareness raising campaign*

| | *Measure / Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Private sector* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Inventorying of equipment containing PCBs** | **720 000** | **2 000 000** | **720 000** | **500 000** | **720 000** | **500 000** | **720 000** | **5 880 000** | **5 880 000** | **0** | **0** |
| 1.1 | Prepare SEA to take over the function of central state agency responsible for operating the database of registered PCBs containing equipment * | | | | | | | | 0 | 0 | | |
| 1.2 | Develop inspection mechanisms of PCB equipment and wastes | 250 000 | | | | | | | 250 000 | 250 000 | | |
| 1.3 | Prepare SEI to carryout inspection in this field | 20 000 | | 20 000 | | 20 000 | | 20 000 | 80 000 | 80 000 | | |
| 1.4 | Ensure availability of appropriate analytical methods to determine PCBs | 200 000 | | 200 000 | | 200 000 | | 200 000 | 800 000 | 800 000 | | 0 |
| 1.5 | Develop schemes of positive influence onto entities, having active roles and responsibilities in this area, mainly on small and middle-scale companies | | 1 000 000 | 500 000 | 500 000 | 500 000 | 500 000 | 500 000 | 3 500 000 | 3 500 000 | | |
| 1.6 | Information campaign to raise knowledge * | 250 000 | | | | | | | 250 000 | 250 000 | | |
| 1.7 | Inventory of equipment containing volumes les than 5 $dm^3$ | | 1 000 000 | | | | | | 1 000 000 | 1 000 000 | | |
| **2** | **To secure environmentally sound destruction of PCBs in Slovakia, with respect to BAT/BEP** | **750 000** | **1 215 000** | **54 179 000** | **52 874 000** | **53 686 000** | **53 686 000** | **53 686 000** | **270 076 000** | **116 041 000** | **6 343 000** | **147 692 000** |
| 2.1 | Elaboration of a program for disposal of equipment containing PCBs | 0 | 1 215 000 | 54 179 000 | 50 984 000 | 53 686 000 | 53 686 000 | 53 686 000 | 267 436 000 | 113 401 000 | 6 343 000 | 147 692 000 |

| | *Measure / Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Private sector* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.2 | Elaboration of a strategy for decontamination and disposal of PCbs in Slovakia | 250 000 | | | | | | | 250 000 | 250 000 | | |
| 2.3 | Ensure elaboration of technical standards for decontamination of PCBs containing equipment and their enforcement through authorized organizations | 250 000 | | | | | | | 250 000 | 250 000 | | |
| 2.4 | Ensure elaboration of technical standards for decontamination of PCBs capacitors and their enforcement through authorized organizations | 250 000 | | | 1 890 000 | | | | 2 140 000 | 2 140 000 | | 0 |
| **3.** | **Clean up of contaminated sites - see Action Plan: Contaminated sites** | | | | | | | | **0** | | | |
| **4.** | **Elaboration and implementation of technical standards concerning determination, transport, storage…of PCBs** | **300 000** | **0** | **0** | **0** | **0** | **0** | **0** | **300 000** | **300 000** | **0** | **0** |
| 4.1 | Elaborate a system and technical standards to exchange PCBs containing equipment in use | 100 000 | | | | | | | 100 000 | 100 000 | | |
| 4.2 | Elaborate procedures for inspection and labeling of decontaminated equipment | 100 000 | | | | | | | 100 000 | 100 000 | | |
| 4.3 | Create a network of organizations authorized for special handling with PCBs... | 100 000 | | | | | | | 100 000 | 100 000 | | |
| **5** | **Information campaign to raise awareness *** | | | | | | | | | | | |
| | | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Private sector* |
| | **Measures in total** | **1 770** | **3 215 000** | **54 899 000** | **53 374 000** | **54 406 000** | **54 186 000** | **54 406 000** | **276 256 000** | **122 221 000** | **6 343 000** | **147 692 000** |

| | *Measure / Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Private sector* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **000** | | | | | | | | | | |
| | ***State budget*** | 1 770 000 | 2 000 000 | 23 593 000 | 23 894 000 | 23 729 000 | 23 509 000 | 23 729 000 | 122 224 000 | | | |
| | ***Regional budgets*** | 0 | 0 | 0 | 6 343 000 | 0 | 0 | 0 | 6 343 000 | | | |
| | ***Private sector*** | 0 | 1 215 000 | 31 306 000 | 23 137 000 | 30 677 000 | 30 677 000 | 30 677 000 | 147 689 000 | | | |

*not included – included in the Action plan: Raising Public Awareness on POPs

## 3.3.1 (i) Activity: Cost estimate for activity 3.3.1 (i) Identification and remediation of contaminated areas

| | *Measure/activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of businesses* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **To secure ecological exploration in PCB contaminated areas in Strážske region and on the sites of former mixing plants** | **0** | **24 432 000** | **24 300 000** | **18 800 000** | **9 500 000** | **2 000 000** | **2 000 000** | **81 032 000** | **81 032 000** | **0** | **0** |
| 1.1. | Prepare implementation strategy for these activities | | 544 000 | | | | | | 544 000 | 544 000 | | 0 |
| 1.2 | Prepare methodology of the exploration | | 816 000 | | | | | | 816 000 | 816 000 | | 0 |
| 1.3 | Unification of analytical methods used in laboratories accredited for chemical analyses of soils and other PCB-containing matrices | | 272 000 | | | | | | 272 000 | 272 000 | | 0 |
| 1.4 | Secure capacities for implementation of the analytical work *1 | | | | | | | | 0 | 0 | | 0 |
| 1.5 | In cooperation with specialized local governments secure entrance to contaminated areas that are subject to ecological examination – costs not calculated – it is a part of the examination itself * | | | | | | | | | 0 | | |
| 1.6 | Secure cooperation with specialized local governments on preparatory and implementation activities * | | | | | | | | 0 | 0 | | 0 |
| 1.7 | Carry out the ecological examination | | 22 300 000 | 23 300 000 | 17 300 000 | 7 500 000 | | | 70 400 000 | 70 400 000 | | |
| 1.8 | Secure regular monitoring of the examined area | | 500 000 | 1 000 000 | 1 500 000 | 2 000 000 | 2 000 000 | 2 000 000 | 9 000 000 | 9 000 000 | | |
| **2.** | **Prepare strategy for contaminated area recovery** | **0** | **250 000** | **200 000** | **0** | **0** | **0** | **0** | **450 000** | **450 000** | | |
| 2.1 | Prioritization of the contaminated areas for their recovery | | | 200 000 | | | | | 200 000 | 200 000 | | |

| | *Measure/activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of businesses* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.2 | Processing of the technical and economical indicators and technology requirements for the decontamination equipment | | 250 000 | | | | | | 250 000 | 250 000 | | |
| **3.** | **Realization of the decontamination activities** | **0** | **0** | **0** | **149 704 000** | **150 867 000** | **150 867 000** | **150 867 000** | **602 305 000** | **0** | **106 305 000** | **496 000 000** |
| 3.1 | Secure financing of the decontamination activities * | | | | | | | | 0 | | 0 | |
| 3.2 | Process technological and technical decontamination procedures – costs not calculated – part of the measure 2.2 | | | | | | | | 0 | | | |
| 3.3 | Cooperate with the local government on popularization of this activity ** | | | | | | | | 0 | | | |
| 3.4 | Cooperate with NGOs ** | | | | | | | | 0 | | | |
| 3.5. | Medially promote this activity and, its results and impact on the environment ** | | | | | | | | 0 | | | |
| 3.6. | Carry out the decontamination activities | | | | 149 704 000 | 150 867 000 | 150 867 000 | 150 867 000 | 602 305 000 | 0 | 106 305 000 | 496 000 000 |
| **4.** | **Headquarters – its establishment and operation** | **556 000** | **1 665 000** | **1 690 000** | **1 715 000** | **1 741 000** | **1 768 000** | **1 796 000** | **10 931 000** | **10 931 000** | **0** | **0** |
| | **Measures total** | **556 000** | **26 347 000** | **26 190 000** | **170 219 000** | **162 108 000** | **154 635 000** | **154 663 000** | **694 718 000** | **92 413 000** | **106 305 000** | **496 000 000** |
| | ***State budget*** | 556 000 | 26 347 000 | 26 190 000 | 20 515 000 | 11 241 000 | 3 768 000 | 3 796 000 | 92 413 000 | | | |
| | ***Regional budgets*** | | | | 25 704 000 | 26 867 000 | 26 867 000 | 26 867 000 | 106 305 000 | | | |
| | ***Contribution of businesses*** | | | | 124 000 000 | 124 000 000 | 124 000 000 | 124 000 000 | 496 000 000 | | | |

* costs not calculated – part of the headquarters

** costs not calculated – part of the Action plan Public Awareness Raising

## 3.3.2 (j) Activity: Cost estimated for activity 3.3.2 (j) Information exchange, education and public awareness rising

| | *Measure/activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of the businesses* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Informing the general and expert public in the short-term horizon** | **1 416 000** | **0** | **40 000** | **0** | **40 000** | **0** | **40 000** | **1 536 000** | **1 536 000** | | |
| 1.1 | Identification of the affected population – Michalovce district | 36 000 | | | | | | | 36 000 | 36 000 | | |
| 1.2. | Preparation of the information material including printing | 1 000 000 | | | | | | | 1 000 000 | 1 000 000 | | |
| 1.3 | Distribution of information materials | 20 000 | | | | | | | 20 000 | 20 000 | | |
| 1.4 | Training program for plant inspectors | 180 000 | 0 | 20 000 | 0 | 20 000 | 0 | 20 000 | 240 000 | 240 000 | | |
| 1.5 | Training program for Customs Administration employees | 180 000 | 0 | 20 000 | 0 | 20 000 | 0 | 20 000 | 240 000 | 240 000 | | |
| **2** | **Information public awareness raising campaign** | **2 156 000** | **0** | **1 840 000** | **0** | **2 120 000** | **0** | **1 840 000** | **7 956 000** | **576 000** | **0** | **7 380 000** |
| 2.1 | Target group identification | 36 000 | 0 | | | | | | 36 000 | 36 000 | | |
| 2.2 | Target group training program * | 2 120 000 | 0 | 1 840 000 | | 2 120 000 | | 1 840 000 | 7 920 000 | 540 000 | | 7 380 000 |
| **3** | **Informing the general and expert public in the long-term horizon** | **2 930 000** | **10 926 000** | **5 860 000** | **5 860 000** | **3 860 000** | **3 860 000** | **3 860 000** | **37 156 000** | **37 156 000** | | |
| 3.1 | Mass-media campaigns – STV, radio broadcasting, NGOs, local governments, press | 2 230 000 | 5 860 000 | 5 860 000 | 5 860 000 | 3 860 000 | 3 860 000 | 3 860 000 | 31 390 000 | 31 390 000 | | |
| 3.2 | Preparation of supplements to study programs for primary and secondary schools, including re-written text-books | 700 000 | 5 066 000 | | | | | | 5 766 000 | 5 766 000 | | |
| 3.3 | Preparation of supplements to individual university study programs * | | | | | | | | 0 | | | |
| | **Measures Total** | **6 502 000** | **10 926 000** | **7 740 000** | **5 860 000** | **6 020 000** | **3 860 000** | **5 740 000** | **46 648 000** | **39 268 000** | **0** | **7 380 000** |
| | ***State budget*** | 4 382 000 | 10 926 000 | 6 080 000 | 5 860 000 | 4 080 000 | 3 860 000 | 4 080 000 | 39 268 000 | | | |
| | ***Regional budgets*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | ***Contribution of the businesses*** | 2 120 000 | 0 | 1 660 000 | 0 | 1 940 000 | 0 | 1 660 000 | 7 380 000 | | | |

## 3.3.2 (k) Activity: Cost estimate of activity 3.3.2 (k) Research, development and monitoring

| | *Measure/Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of the businesses* | *Note* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Establishment of POPs monitoring working group** | **29 000** | **0** | **0** | **0** | **0** | **0** | **0** | **29 000** | **29 000** | | | |
| 1.1 | Negotiation between ministries in order to agree on working group establishment and definition of its tasks and responsibilities | 23 000 | | | | | | | 23 000 | 23 000 | | | |
| 1.2 | Nomination of experts from involved institutions | 4 000 | | | | | | | 4 000 | 4 000 | | | |
| 1.3 | Working group activities start | 2 000 | | | | | | | 2 000 | 2 000 | | | |
| **2.** | **Elaboration of strategy on harmonised POPs monitoring system on national level** | **27 000** | **58 000** | **0** | **0** | **0** | **0** | **0** | **85 000** | **85 000** | | | |
| 2.1 | Elaborate analysis of Stockholm Convention requirements and EPR Regulation on monitoring | 12 000 | 14 000 | | | | | | 26 000 | 26 000 | | | |
| 2.2 | Update analysis of POPs investigation under existing monitoring programmes | 15 000 | 17 000 | | | | | | 32 000 | 32 000 | | | |
| 2.3 | Define activities needed for harmonisation of existing monitoring progremmes and requirements of the Stockholm Convention and Regulation (ES) No. 850/2004 on POPs | | 27 000 | | | | | | 27 000 | 27 000 | | | |
| **3.** | **To ensure monitoring based on the elaborated national plan** | **0** | **43 000** | **548 000** | **0** | **0** | **0** | **0** | **591 000** | **591 000** | | | |
| 3.1 | Identification/update of monitoring networks | | 43 000 | 274 000 | | | | | 317 000 | 317 000 | | | |
| 3.2 | Definition of investigated parameters | | | 137 000 | | | | | 137 000 | 137 000 | | | |
| 3.3 | Definition of sampling time | | | 137 000 | | | | | 137 000 | 137 000 | | | |
| **4.** | **To check methods and to ensure coordination of laboratories in order to use sufficiently precise** | **0** | **737 000** | **669 000** | **0** | **0** | **0** | **0** | **1 406 000** | **1 406 000** | | | |

| | *Measure/Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of the businesses* | *Note* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **and selective analytical methods** | | | | | | | | | | | | |
| 4.1 | Check of selectivity of routinely used methods of OCPs detection in presence of other organic substances | | 737 000 | | | | | | 737 000 | 737 000 | | | |
| 4.2 | Elaboration of list of recommended detection methods for OCPs | | | 172 000 | | | | | 172 000 | 172 000 | | | |
| 4.3 | Organization of ring tests | | | 382 000 | | | | | 382 000 | 382 000 | | | |
| 4.4 | Evaluation of selectivity of used OCP measurement methods | | | 115 000 | | | | | 115 000 | 115 000 | | | |
| **5.** | **To ensure information exchange between institutions responsible for monitoring and body / bodies responsible for reporting** | **0** | **0** | **220 000** | **0** | **0** | **0** | **0** | **220 000** | **220 000** | | | |
| 5.1 | Definition of format of reporting | | | 165 000 | | | | | 165 000 | 165 000 | | | |
| 5.2 | Elaboration of reporting plan and time schedule | | | 55 000 | | | | | 55 000 | 55 000 | | | |
| **6.** | **To ensure accessibility of monitoring results to broad expert and laymans publics in understandable form** | **0** | **0** | **466 000** | **0** | **0** | **0** | **0** | **466 000** | **466 000** | | | |
| 6.1 | Creation / upgrade of GIS applications | | | 392 000 | | | | | 392 000 | 392 000 | | | |
| 6.2 | Creation of information portal on POPs | | | 74 000 | | | | | 74 000 | 74 000 | | | |
| **7.** | **To support research in selected issues** | **0** | **0** | **839 000** | **0** | **0** | **0** | **0** | **839 000** | **839 000** | | | |
| 7.1 | Elaborate and publish a call for project proposals | | | 6 000 | | | | | 6 000 | 6 000 | | | |
| 7.2 | Project selection | | | 69 000 | | | | | 69 000 | 69 000 | | | |
| 7.3 | Implementation of research projects | | | 764 000 | | | | | 764 000 | 764 000 | | | |
| | ***Measures total*** | **56 000** | **838 000** | **2 742 000** | **0** | **0** | **0** | **0** | **3 636 000** | **3 416 000** | | | |
| | ***Real Monitoring*** | | | | **1 000 000** | **1 000 000** | **1 000 000** | **1 000 000** | **4 000 000** | | | | |
| | ***State budget*** | 56 000 | 838 000 | 2 742 000 | 1 000 000 | 1 000 000 | 1 000 000 | 1 000 000 | **7 636 000** | | | | |
| | ***Regional budgets*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |

| | *Measure/Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of the businesses* | *Note* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Contribution of businesses*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |

## 3.3.2 (l) Activity: Cost estimate of activity 3.3.2 (l) Information exchange and stakeholders involvement

| | *Measure/Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of the businesses* | *Note* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Establishment of the National Focal Point for reporting on POPs and authorization of national institutions.** | **519 000** | **317 000** | **145 000** | **150 000** | **156 000** | **167 000** | **172 000** | **1 626 000** | **1 626 000** | | | |
| 1.1 | Talks between the ministries with the purpose of NFP-POPs establishment | 45 000 | | | | | | | 45 000 | 45 000 | | | |
| 1.2. | Establishment of NFP-POPs and its operation (NFP-POPs equipment 400.000) | 474 000 | 42 000 | 66 000 | 68 000 | 70 000 | 74 000 | 76 000 | 870 000 | 870 000 | | | |
| 1.3 | Establishment and operation of NFP-POPs web page | | 275 000 | 79 000 | 82 000 | 86 000 | 93 000 | 96 000 | 711 000 | 711 000 | | | |
| **2** | **Development and implementation of an effective system for provision of information by responsible institutions to the National Focal Point** | **0** | **736 000** | **0** | **0** | **0** | **0** | **0** | **736 000** | **736 000** | | | |
| 2.1 | Discussions between ministries | | 60 000 | | | | | | 60 000 | 60 000 | | | |
| 2.2 | **Information campaign for public awareness raising (not calculated, see work wit public)** | | 636 000 | | | | | | 636 000 | 636 000 | | | |
| 2.3 | Meeting of the stakeholder institutions and NFP-POPs with the aim to get familiar with the methodologies | | 40 000 | | | | | | 40 000 | 40 000 | | | |
| **3** | **To Secure effective recording of the POPs compounds imports and exports on institutional level between MI SR and Customs directorate** | **189 000** | **160 000** | **0** | **0** | **0** | **0** | **0** | **349 000** | **349 000** | | | |
| 3.1 | Inter-ministry negotiations with the aim to define appropriate measures for effective registration of the real exported and imported quantities of POPs | 189 000 | | | | | | | 189 000 | 189 000 | | | |
| 3.2 | Modification of existing registration system for facilitating the provision of information on POPs exports and imports. | | 106 000 | | | | | | 106 000 | 106 000 | | | |
| 3.3 | Definition of format for provision of information on actual quantities of imported and exported POPs to the NFP-POPs | | 27 000 | | | | | | 27 000 | 27 000 | | | |

| | *Measure/Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of the businesses* | *Note* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.4 | Definition of format for provision of information on POPs production in Slovak Republic | | 27 000 | | | | | | 27 000 | 27 000 | | | |
| **4** | **Securing the flow of information between stakeholder institution and NFP-POPs on gradual elimination of the use of PCB-containing equipments in Slovakia** | **0** | **133 000** | **0** | **0** | **0** | **0** | **0** | **133 000** | **133 000** | | | |
| 4.1 | Modification of the existing mechanism for registration of PCB-contaminated equipments and facilitation of provision of information to the NFP-POPs | | 106 000 | | | | | | 106 000 | 106 000 | | | |
| 4.2 | Definition of format for provision of information on the PCB-contaminated equipments in Slovakia | | 27 000 | | | | | | 27 000 | 27 000 | | | |
| **5** | **Introduction of an effective system for monitoring of handling with POPs-containing plant-protecting preparations after their expiry period.** | **0** | **133 000** | **0** | **0** | **0** | **0** | **0** | **133 000** | **133 000** | | | |
| 5.1 | Modification of the existing mechanism of registration of the stocks of POPs plant-protecting preparations after their expiry period in order to improve provision of information to the NFP-POPs. | | 106 000 | | | | | | 106 000 | 106 000 | | | |
| 5.2 | Definition of format for provision of information on POPs plant-protecting preparations after their expiry period stocks in Slovakia. | | 27 000 | | | | | | 27 000 | 27 000 | | | |
| **6** | **Establishment of an effective system for monitoring of origin and handling of the POPs-containing hazardous wastes as well as their imports and exports.** | **189 000** | **133 000** | **0** | **0** | **0** | **0** | **0** | **322 000** | **322 000** | | | |
| 6.1 | Modification of current legal requirements in order to achieve effective registration of POPs containing waste | 189 000 | | | | | | | 189 000 | 189 000 | | | |
| 6.2 | Modification of the existing system of waste registration in Slovakia, in order to facilitate provision of information on POPs-containing hazardous waste handling, imports and exports to the NFP-POPs | | 106 000 | | | | | | 106 000 | 106 000 | | | |

| | *Measure/Activity* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *Total* | *State budget* | *Regional budgets* | *Contribution of the businesses* | *Note* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.3 | Definition of format for provision of information on POPs-containing waste | | 27 000 | | | | | | 27 000 | 27 000 | | | |
| | ***Measures total*** | **897 000** | **1 612 000** | **145 000** | **150 000** | **156 000** | **167 000** | **172 000** | **3 299 000** | **3 299 000** | | | |
| | ***State budget*** | 897 000 | 1 612 000 | 145 000 | 150 000 | 156 000 | 167 000 | 172 000 | 3 299 000 | | | | |
| | ***Regional budgets*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| | ***Contribution of businesses*** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |