UNIDO, June 2010

Capacity Building for environmentally sound management of PCBs in Romania (Disposal of PCBs Waste)

(GF/ROM/07/001)

"We are part of the mother nature of our Earth and we have to take care of our common environment. Not our parents have left us the world in which we live, but our children have lent it to us, trusting to get back later a better world"

The Evaluation Mission Team was composed of the following members:

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ACKNOWLEDGMENT

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The professionalism and the dedication of all the staff involved in the project implementation have supported the Evaluation Team in fulfilling its tasks.

Finally, the Evaluation Team wishes to express its thanks to Mr. Mihai Lesnic the National Project Coordinator for being available for the Evaluation Team as resource person and for clearing up the technical details and queries the Team had during the field visits.

The Team also thanks Ms. Tamara Babayan, project assistant staff of UNIDO for providing the necessary documentation requested.

The Evaluation Team trusts that the proposed recommendations will allow the management of the project to optimize the utilization of the resources, with the objective to complete the implementation of the forecasted outputs.

Environmental consciousness and the sustainable utilization of the natural resources through adopting environmentally sound technologies should be the principle of the entire industrial world.

ABBREVIATIONS AND ACRONYMS USED IN THE REPORT

ADR	European Agreement about International Transport of Dangerous Goods by Road
BAT	Best Available Technologies
BEP	Best Environmental Practices
CTA	Chief Technical Advisor
DAC	Development Assistance Committee
ESM	Environmentally Sound Management
EST	Environmentally Sound Technologies
EU	European Union
GEF	Global Environment Facility
HCH	Hexachlorocyclohexane
ICIM	National Institute for Research and Development for the Protection of the Environment
LEPA	Local Environment Protection Agency
MoU	Memorandum of Understanding
M&E	Monitoring and Evaluation
MSP	Medium Sized Project
NEF	National Environmental Fund
NEG	National Environmental Guard
NEPA	National Environmental Protection Agency
NGO	Non Governmental Organization
NIP	National Implementation Plan
NPC	National Project Coordinator
OECD	Organization for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
PCB	Polychlorinated Biphenyl
PHARE	Programm of EU for Aid for Restructuring of the Economies
POPs	Persistent Organic Pollutants
ppm	parts per million
PSC	Project Steering Committee
REPA	Regional Environment Protection Agency
S.R.L.	Limited Liability Company
TCB	Trichlorobenzene
UN	United Nations
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization

MAP OF ROMANIA

Itinerary of the Mission

Source: http://maps.yahoo.com

A – Timisoara, B – Filiasi, C – Bucharest, D – Slobozia, E – Braila

1 EXECUTIVE SUMMARY

1.1 Background

The Stockholm Convention in preparing the National Implementation Plan (NIP) for Romania identified the PCB issues as one of the top priorities requiring immediate attention and action. This was the rationale for developing a project for solving PCB-related activities. GEF accepted to fund this project to assist the Government in implementing its obligations for PCB elimination, in order to demonstrate possible implementation of locally viable and environmentally sound PCB control measures. Therefore, the project has promoted sustainable reduction and destruction of PCBs through a more efficient and cost-effective approach for the PCB owners.

Romania needs the appropriate infrastructure to manage PCB elimination in an environmentally sound manner, with specialized treatment disposal facilities. In this regard, there was also a well-recognized need to increase awareness and to train government officials and specialists from industries on the criteria for ESM, including final disposal of POPs, in the context of the Stockholm Convention. Several local companies disposed limited volumes of PCB containing equipment, but at the time of the formulation of the project, there were no government-driven national management plans implemented.

1.2 Objectives of the project

Main objective of the project was to overcome the barriers, which hamper the implementation of the PCB-related obligations based on the Stockholm Convention. The project aims at strengthening an ESM system of PCBs based on a general cooperation consensus between relevant government authorities and private and public sectors. The aim is that all activities should be undertaken in controlled and coordinated manner by protecting human health and environment from the harmful effects of PCBs. The concept was to test in practice all the elements of this management system in three demonstration areas. These elements include identification, labelling, safe collection, interim storage and disposal.

1.3 Resources

The total budget has been: US$ 2,020,000, divided as follows:

- GEF: 1,000.000. US$
- Romanian Government and Romanian Parties**:** US$ 200,000 and US$ 800.000 **(**in-kind contribution, including office space, local staff, and some other local expenditure)
- UNIDO (in kind) US$ 20,000

1.4 Results of the Implementation (Findings)

Quantified objectives of the project were the collection and environmentally sound disposal of at least 300 tons of PCB-containing equipment and undertaking inventory of 8000 pieces of equipment.

Public awareness activities have also been important pillars of the project.

The beneficiaries of the awareness have been the environment related organizations of the Government, PCB owners, such as the main electrical utilities, the energy intensive industries, hazardous waste management enterprises and disposal facilities.

Meetings and workshops have been part of the project implementation.

The project has also provided equipment to the enterprises of the three selected pilot demonstration areas.

The project exceeded the foreseen two year duration, but without increasing the forecast budget.

The funds so far allocated have enabled the implementation of the inventory database for transformers, which is kept in ICIM. Having put in place best available technologies for disposal of PCBs and PCBs containing equipment, the targets established in the project have been largely exceeded by eliminating 1,166 tons of PCB containing equipment against the planned 300 tons.

Further, 6915 PCB oil samples have been collected and analysed, against the 8000 targeted.

The project is a good example of cooperation between state and private sector to achieve global environmental benefits.

The project has strengthened three laboratories for the analysis of PCB samples collected and has approached 339 companies providing awareness and training on PCBs.

These enterprises have participated in the inventory exercise that is covering all the country.

The national legislation (Government Decision no. 975 of 22 August 2007) sets 31 December 2010 as deadline for the elimination of all PCB-containing wastes. However, the utilization of operational equipment containing PCBs is allowed until the end of its life cycle, which is contradictory to Annex A Part II of the Stockholm Convention, which was ratified by Law no. 261 of 16 June 2004.

To conclude the project has been a big success developing the activities for collection, transport and disposal of PCB equipments and increasing safety for people and environment in general. The deadline imposed by the Stockholm Convention for the elimination of the PCBs has led to a considerable increase of the PCB containing equipment to be disposed and has, therefore, increased the importance of the GEF / UNIDO project for Romania.

1.5 Impact

An important impact has been the awareness campaign.

However, an extremely important and concrete outcome has been that the project has selected an alternative approach to subsidize PCB disposal (local pre-processing of the waste, local PCB disposal technologies versus export treatment).

Following this procedure the unit cost of PCB disposal has decreased from around 5.5 US$ per kg, at the beginning of the project activities, to around 1.2 US$ per kg presently.

Applying local pre-processing of the PCB-wastes and disposing them in the country versus the option of their shipment abroad (after careful local packaging according to the international requirements) for disposal, has reduced the price and accelerated the disposal.

The diversity of locally available disposal technologies for the PCB elimination has been developed thanks to the project, which has established three interim storage locations and procured equipment for their operation.

Occupational safety measures for the people involved and exposed to the hazards of this exercise are well established and according to the international legislations and standards.

The project has demonstrated the effectiveness of the ESM system in three selected demonstration areas.

The total co-financing of the project can be calculated in 1,642,000 US$ that is slightly above the desired 1:1.5 ratio for co-financing the received GEF contribution.

1.6 Recommendations

According to its findings the Evaluation Team presents the following recommendations:

To Ministry of Environment and Forests:

- Approve and publish the legislation on ESM system.
- It is imperative that Ministry and NEPA continue the monitoring of PCB inventory and disposal activities, according to Stockholm Convention requiring regular national reporting on PCB inventory.
- Consider the possibility to utilize the National Environmental Fund to subsidize some disposal costs, particularly because the inventory has identified PCB-containing equipment for which the responsible owners are no longer commercially active (bankrupt). The disposal of this equipment has not yet been solved and the National Environmental Fund could be possibly used as financial support in this regard.

To Ministry of Environment and Forests and ICIM:

- The capacity the project created within ICIM in the field of PCB management should be maintained and utilized for other POPs related activities such as inventory and disposal of HCH wastes and contaminated soils. The Government should continue to support promoting private sector investments into this field. State-of-the-art technologies can further reduce the costs of disposal of not only PCBs, but also of other POPs such as hexachlorocyclohexanes (HCH).
- The ESM system for PCBs needs to be approved and promulgated. The laboratory capacity, created by the project, should be maintained and utilized for the inventories of newly added POPs under the Stockholm Convention. The activities for replication of the achievements of the project should continue.

To NEPA:

- NEPA should continue the monitoring of implementation of the phase-out plans. Cooperation between NEPA and ICIM concerning the analysis of the oil samples for PCBs should be maintained utilizing the laboratory of ICIM.
- NEPA and ICIM shall regularly inform the POPs focal point in the Ministry of Environment and Forests on the PCB inventory and phase-out activities so that the concerned authorities could be informed and kept updated.

To the National Environment Guard:

- Adherence to the ESM system should be assured and enforced by regular and periodical inspections at the PCB locations by the National Environment Guard.

To UNIDO and GEF:

- UNIDO and the GEF should disseminate the results of the project in other countries for replication.
- Continue to support projects in the area of POPs, particularly considering that new chemicals have been added to the list of the Stockholm Convention.
- Bring these positive achievements to the attention of official channels of Romanian authorities to further disseminate awareness and promote the possibility of further cooperation under the GEF portfolio.
- High political and technical level personnel of the Ministries involved in the activities of the project should be invited to the final technical workshop concerning the closure of the project.

To the management of the project:

- Detailed reports should be transmitted to UNIDO (Implementing Agency) on a quarterly basis by the National Director as specifically stated in the project document. Unfortunately this procedure has not always been strictly followed. In case of other similar projects this procedure

should be carefully monitored. The degree of achievement of the objectives should be indicated for each output.

- Direct project assistance to individual enterprises should be strictly limited to those taking part in a pilot scheme for demonstration purpose, to avoid the risk of market distortions.
- The training and upgrading of skills and capacities should not stop at the end of the training course or seminar, but be reinforced periodically through refreshing courses and continuous professional advice.

2 PRESENTATION AND ANALYSIS OF THE PROJECT

2.1 Project description

2.1.1 Project general information:

Project Name	Capacity Building for Environmentally Sound Management of PCBs in Romania
Project's GEF ID Number	2715
Country	Romania
GEF Focal Area and Operational Program	OP 14, POPs-2
Agency	UNIDO
Project Approval Date	13 February 2007
Date of Project Effectiveness	June 2007
Total Project Cost	2,025,000 US$
GEF Grant Amount	1,000,000 US$
GEF Project Preparation Grant Amount (if any).	48,000 US$

This project was financed by the GEF (Global Environment Facility) implemented by UNIDO (United Nations Industrial Development Organization) and at the national level executed by the National Institute for Research and Development for the Protection of the Environment - ICIM .

The Global Environment Facility was established in October 1991 as a US$ 1 billion pilot program in the World Bank to assist in the protection of the global environment and to promote environmental sustainable development. The GEF provided new and additional grants and concessional funding to cover the additional costs associated with transforming a project with national benefits into one with global environmental benefits. UNDP, UNEP, and the World Bank were the three initial partners implementing GEF projects. In 1994, at the Rio Earth Summit, the GEF was restructured and moved out of the World Bank system to become a permanent, separate institution.

As independent financial organization, the GEF provides grants to developing countries and countries with economies in transition for projects in selected focal areas related to biodiversity, climate change, international waters, land degradation, the ozone layer and persistent organic pollutants.

These projects benefit to the global environment, linking local, national, and global environmental challenges and promoting sustainable livelihoods.

The GEF is today the largest funder of projects to improve the global environment. So far, the GEF has allocated US$ 8.8 billion, supplemented by more than US$ 38.7 billion in co-financing

more than 2,400 projects in over 165 developing countries and countries with economies in transition.

As part of its restructuring, the GEF was entrusted to become the financial mechanism for several international conventions such as the Stockholm Convention.

In partnership with the Montreal Protocol of the Vienna Convention on Ozone Layer Depleting Substances, later the GEF started also funding projects that are enabling Russian Federation and nations in Eastern Europe and Central Asia to phase out their use of ozone-destroying chemicals.

The GEF subsequently was also selected to serve as financial mechanism for The Stockholm Convention on Persistent Organic Pollutants (2001) and, therefore, in this framework, is financing this project.

The National Implementation Plan (NIP) according the Stockholm Convention for Romania identified the PCB issues (which are chemical substances included in the POPs by the Stockholm Convention) as one of the top priorities requiring immediate attention and action.

Confidence in UNIDO's assistance in the development of the NIP and its action plans provided the rationale to continue the PCB-related activities with this Medium Sized Project (MSP).

The GEF funding through this project is consolidating ongoing and baseline activities of the Romanian Government in implementing its international obligations for PCB elimination. The funding is demonstrating the possibility to implement locally viable and environmentally sound PCB control measures and their incorporation into national policy framework. Ultimately, this will facilitate sustainable reduction of PCBs in Romania through subsequent scaling up of the demonstration activities of the project, so that more efficient and cost-effective approach for PCB destruction will be available for PCB owners.

The country needs the necessary infrastructure to manage PCBs and PCB containing equipment in an environmentally sound manner. At the time of starting the project Romania was lacking specialized PCB management and disposal facilities.

In this regard, there was a well-recognized need to increase awareness and to train government officials and specialists from industries on the criteria for environmentally sound management, including final disposal, of POPs as waste in the context of the Stockholm and Basel Conventions.

The country had limited experience on the practical management of PCBs. Several international and local enterprises have disposed of limited volumes of PCB containing equipment abroad.

The main objective of the project is to overcome the barriers, which impede upon the implementation of the PCB-related obligations of the Stockholm Convention in Romania.

The project foresees the strengthening of an environmentally sound management system (ESM) of PCBs based on a consensus between relevant government authorities, the private and public sectors.

The project is expected to create a sound environment for all PCB-related activities. The aim is that all activities should be undertaken in a controlled and coordinated manner by protecting human health and the environments from the harmful effects of PCBs.

The GEF resources are used to establish the necessary environment for implementation of the ESM system and to develop a sustainable mechanism to complete the PCBs disposal in Romania through three demonstration areas.

The main outcome of the project was the increased national capacity to manage PCBs in an efficient and environmentally sound manner, including trained human capacity, improved regulations, financing options and physical facilities for management of PCBs.

The purpose of the project has been achieved through development of a national-wide Environmentally Sound Management (ESM) system, which mobilizes all concerned parties to participate in implementing the PCB related obligations of the Stockholm Convention.

The ESM system includes:

- The relevant regulation updated, according to the obligations of the Stockholm Convention, European Union directives, and other international environment-related agreements.
- Detailed guidelines for managing PCBs, PCB-containing or PCB-contaminated articles and wastes,
- Resource mobilization mechanisms for owners of PCBs and PCB wastes,
- Availability of trained specialists,
- Improved monitoring facilities,
- Demonstration facilities, etc.

Project implementation is expected to raise awareness concerning PCBs, assist in developing safety measures for personnel servicing PCB-containing equipment, prevent further contamination of equipment and environment by PCB, and provide the environmental authorities with capacities for environment monitoring and management at the national and local levels.

2.1.2 Organizational arrangements for implementing the project:

The Government of Romania, through the Ministry of Environment and Forests, nominated the National Research-Development Institute for Environmental Protection - ICIM to be the National Executing Agency in charge of coordinating activities at country level. The institute expertise has been proven through their leading role in the country during the development of the National Implementation Plan (NIP).

Task teams have been composed for the implementation of specific activities of the project.

Project related decisions and monitoring at country level are conducted by a Project Steering Committee.

The overall implementation of the project has been supported and monitored by UNIDO.

2.2 Analysis of concept and design of the project

2.2.1 National context

When the project proposal was written and approved Romania was a country with economy in transition. It ratified the Stockholm Convention on POPs (Persistent Organic Pollutants) on 16 June 2004 by the national Law No. 261.

The country, with the assistance of GEF, developed the NIP as per Article 7 of the Convention. The convention foresees that each participant country shall develop a plan to implement its obligations in the framework of the Convention. Persistent organic pollutants possess toxic properties, resist degradation and are transported trough air, water and migratory species, across international boundaries and deposited far from their place of release, where they accumulate in terrestrial and aquatic ecosystems.

The article 12 of the Stockholm Convention states that appropriate technical assistance to parties with economies in transition shall be made available, to assist them, taking into account their

particular needs, to develop and strengthen their capacity to implement their obligations under the Convention.

Further, according the article 13, new and additional financial resources shall be made available to enable parties with economies in transition to meet the agreed full incremental costs of implementing measures to fulfil their obligations under the Convention.

All national stakeholders have participated jointly in the preparation of the NIP. Their joint actions resulted in the establishment of a non-formal system of cooperation among governmental agencies, industries and NGOs. The stakeholders showed strong commitments towards implementation of the formulated needs and readiness to continue the cooperation by implementing the crucial measures of the NIP.

The Romanian National Implementation Plan was endorsed in 2004 and this project reflects the national priorities set out in it.

The Romanian NIP identified eleven key objectives prioritised based on *Priority Setting Criteria.* The prioritization criteria depend on the extent, which the responsible parties should address a particular key objective in the national environmental protection strategy. Concerning the POPs related health and environmental problems and the needs of immediate actions by the responsible parties are the objectives. These priorities and relevant activities of the NIP have been discussed and agreed with ministries, industries, NGOs, academia and community based organizations.

The priority setting was sufficient for defining PCBs and PCB wastes as the highest priority area for actions. The PCB action plan of the NIP aims at eliminating the existing stocks of PCBs that include: identification and inventory of PCBs, the management of stockpiles and the disposal of PCB wastes in an environmentally sound manner.

The identified NIP priorities, the accession to the EU and the conformity to the National Environmental Action Plan provide the appropriate enabling environment for effective implementation of this project, which is financed by the GEF.

The GEF Operational Programme on Persistent Organic Pollutants (POPs) foresees financial assistance to countries with economies in transition in three areas:

1) Capacity building, 2) on-the-ground interventions 3) targeted research.

This project falls primarily under the capacity building activities at the national level, and secondly, it targets on-the-ground interventions.

The capacity building activities foreseen by the project are in line with the GEF priorities.

The project contributes to global environmental objectives. Through the development and introduction of environmentally sound management of the PCBs framework, the possibility of environmental contamination and human exposure to PCBs will be reduced.

By environmentally sound disposal of the equipment and waste, which are in the most critical condition, the risk of PCB releases to the global atmosphere, soil, and water bodies will also be eliminated.

The project has also targeted to test 8.000 pieces of equipment in three selected demonstration areas and to dispose of 300 tons of PCB-containing electrical equipment.

2.2.2 Project Design

The design of the project has been based on the Romanian National Implementation Plan. During its preparation and development serious weaknesses of the current legal and organizational aspects of PCBs were identified.

The preliminary PCB inventory of the NIP is mainly based on the previous official documents. Due to lack of time and funds, the inventory process has been unable to undertake site inspections and physical testing. These shortcomings were identified during the NIP development and received great attention. The PCB issue was identified as one of the most important priorities of the NIP and the specific action plan on PCB has indicated the necessary actions to resolve this issue.

The design of this project is a detailed elaboration of that action plan.

During the phase of developing the project, field visits were launched to collect as much information as possible to map the situation and to define the proposed actions. A workshop with the participation of all principal stakeholders was organized in Bucharest in July 2005 and the concept of the future project was discussed.

The preparatory work showed that the legal background for sustainable PCB management needed to be improved. In 2006 in Romania there was no legal act concerning the handling, treatment of PCB containing equipment. At that time the management system for PCBs was lacking.

The EU accession of the country resulted in the adoption and enacting of certain legislations such as Governmental Decision No. 173/2000 on the management and control of PCB, which set 31 December 2010 as a deadline for using equipment containing PCB in concentrations between 50 – 500 ppm and volumes higher than 5 dm^3 .

The governmental Decision 291 of 7 April 2005 amended this regulation and set the ultimate deadline for withdrawing equipment containing PCBs higher than 50ppm for 31 December 2010.

At the time of the preparation of the project document, involved ministries and authorities were aware of the PCB issue, but the local authorities lacked the necessary knowledge and expertise.

The need for an organized system, which includes governmental stakeholders and the private sector, has been identified.

The preliminary inventory during the NIP development identified a total of 3,391 tons of PCBs and PCB wastes. This survey covered eight areas: Tirgu Jiu, Mintia, Slatina, Zalau, Bucuresti, Sibiu and Miercurea Ciuc.

During the preparatory phase, additional efforts have been done to receive more accurate estimation of volumes of PCBs and PCBs wastes.

These figures have been discussed at the national workshop held in Bucharest July 2005 and the participants agreed that the estimation of the PCBs to be disposed had to be increased by 1.5-2 times.

The uncertainty of these figures makes difficult the planning for phasing out and disposal and it places uncertainty on the scope of measures required to solve the PCB problems and the barriers for any initiatives in this issue at the governmental level.

The private sector was mostly reluctant to implement PCB containment, phasing out and disposal measures due to lack of national regulations.

SC Electrica SA, the major user of electrical equipment, was aware of the problem. It was a state-owned company, subordinated to the Ministry of Economy and Commerce, and was under privatization process at the time of writing the project proposal. Its core activity was electricity generation, transmission and distribution.

According the indications of the project document, SC Electrica SA operated its economic activities as a natural monopoly, with the obligation to ensure access to its networks for all customers, suppliers and electricity generators. During the project implementation SC Electrica SA had been split into several small enterprises, which were privatised creating free market competition in the national electricity sector.

The NIP identified that many owners of PCB-containing equipment did not have the established procedures and safety measures for servicing, maintenance and disposal of the equipment.

The compulsory guidelines for the procedures for inventory taking, labelling, the reporting format of these activities as well as the guidelines for withdrawal and disposal of PCB-containing equipment and a feasible and sustainable solution for the management of PCBs were to be developed by the government.

The condition of the electrical equipment and wastes storage locations and their maintenance practice have been reviewed and checked during the field visits. According to the survey, electrical equipment and storage locations, which were visited, were in many instances in unacceptable condition.

Therefore, there was the necessity to introduce environmental monitoring measures at these locations for the early identification of PCB contaminations.

Due to low awareness and lack of proper instructions for personnel, the maintenance practice was designed without preventing a possibility of PCB cross-contamination.

The project proposal concluded that other users of transformers and capacitors containing PCBs such as hotels, airports, medium - or large-sized industrial facilities would not be able to cope alone with all the measures required by the Stockholm Convention without proper guidance, management and support.

The system of certification of hazardous waste management companies had to be developed in order to give the owners of PCB-containing equipment a possibility to receive the qualified assistance.

The project proposal foresaw the improvement of the PCB storage locations and the establishment of three interim storage areas for PCBs and PCB-containing equipment.

There were some industrial hazardous waste incinerators in Romania, but they were not capable of PCBs incinerating in an environmentally sound manner. Their operating costs were higher than the operating costs at West European facilities, therefore the practice was to transport PCB-containing equipment and wastes abroad for disposal.

The first step for resolving the PCB problem was the development of a countrywide detailed inventory estimate, based on detailed inventories for three representative regions. The project planned to come up with figures for the whole country. These figures are crucial for cost-effective phase-out and the selection of technical options for disposal of PCB and PCB wastes in Romania.

The project document builds on the PCB action plan prepared by the NIP and addresses outstanding issues such as refining the PCB inventory, resources mobilization to withdraw and dispose PCB-containing electrical equipment and public involvement in the implementation process.

The project document aimed at developing a feasible financial mechanism to assist owners of PCBs to work jointly in eliminating PCB-containing equipment and disposing PCB wastes. The design of the project foresaw the preparation and development of all necessary legislations and guidelines to support the ESM system and the financial mechanism.

Site inspection tools, methods for PCB testing, laboratories, data reporting formats, maintenance practices of the electrical equipment and field monitoring guidelines were to be developed as parts of the ESM system. Trainings and workshops were foreseen at governmental and local levels, in order to build the necessary technical expertise for the practical implementation of the ESM system.

Further, the project aimed at the full country inventory.

During the phase of the design of the project, it was concluded that the needs for establishing interim storages for PCBs were presenting the following problems/advantages/disadvantages:

- existing storages were very often in bad or at least in insufficient conditions;
- there are a lot of "minor" owners of PCB where a proper storage was not possible;
- transportation for long distances of small quantities of PCB wastes is expensive;
- national disposal facilities were not sufficient and their establishment would take some more years; the only immediate available solution for proper disposal was to export abroad the waste for safe destruction;
- cost-effective separation of different PCB waste types such as liquids, solids, empty transformers or capacitors, to be made by the owners was not possible;
- interim storages could represent a centre of competence for practical handling and testing of PCB devices; this would reduce the risks for human exposure;
- interim storages should have an ESM system and protective measures against accidents;
- regular medical check-up of personnel dealing with PCBs should be put into practice and could be easily performed.

It is foreseen in the project document that interim storages will be identified and that measures to upgrade them to international standards will be developed. These facilities will be used to store decommissioned PCB-containing equipment and PCB wastes in an environmentally sound manner.

The design aimed at establishing three demonstration areas selected for the implementation of the ESM system and detailed inventories. PCB containing equipment in the most critical condition would be collected and disposed of. The achievements of the field implementation measures at the demonstration areas would also be available for implementation in other regions of the country.

The project design wants to demonstrate that sustainable cooperation among Government and private sector is possible by involving them in the decision making process throughout the development of the ESM system and by providing additional financial resources for its implementation.

The project implementation strategy was based on the following principles:

- established and well-defined cooperation among governmental bodies, local authorities and private sector;
- accountability of the project-related work and expenditures of all involved parties;
- clearly defined monitoring indicators and methodologies throughout the implementation.

2.3 Which are POPs, PCBs and their sources

2.3.1 POPs Generalities

The **Stockholm Convention on Persistent Organic Pollutants** is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods and become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife.

POPs are carbon based organic – halogenated substances:

- highly toxic for the environment, humans and wildlife;
- persistent in the environment and resisting to biodegradation;
- accumulating in terrestrial and aquatic ecosystems;
- widely distributed throughout the environment as a result of natural processes involving soil, water and, most notably, air;
- accumulate in the fatty tissue of living organisms, including humans, and at higher levels of concentration than in the food through a process called bioaccumulation.

In nature, these substances affect plant and human and animal development and growth. Exposure to POPs can lead serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to diseases.

This group of pollutants initially consisted of:

- **Pesticides**: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene;
- **Industrial chemicals:** hexachlorobenzene, polychlorinated biphenyls (PCBs);
- **By-products** (Unintentionally produced POPs)**:** hexachlorobenzene; polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans and PCBs.

Given their long range transport, the Stockholm Convention, which was adopted in May 2001 and entered into force 2004, requires the Governments to take measures to eliminate or reduce the release of POPs into the environment.

As a result of releases to the environment over the past several decades due especially to human activities, POPs are now widely distributed over large regions (including those where POPs have never been used). This extensive contamination of environmental media and living organisms includes many foodstuffs and has resulted in the sustained exposure of many species, including humans, for periods of time that span generations, resulting in both acute and chronic toxic effects.

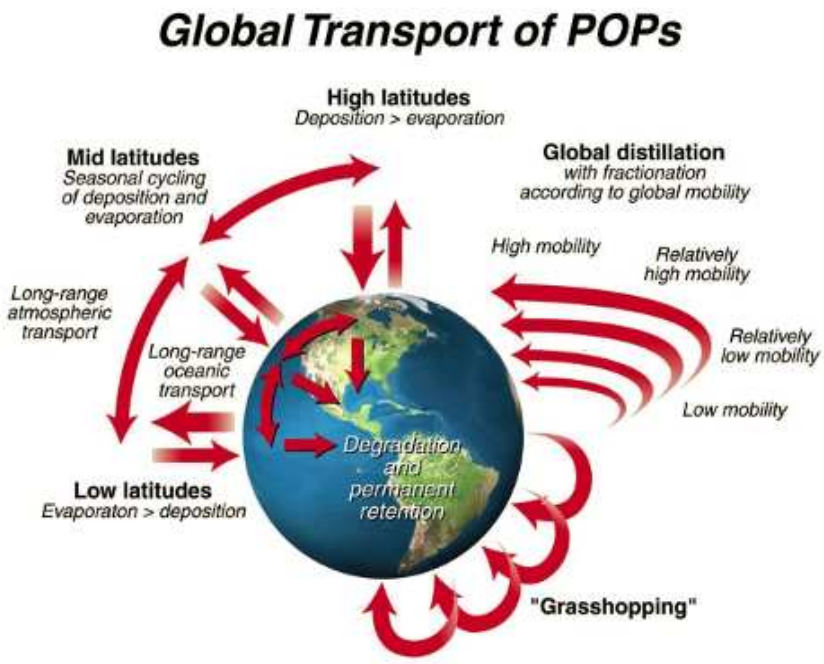

Figure 1: Global transport of POPs

Due to the global risks posed by the long range transport of POPs, they represent a problem that has to be dealt with not only locally but also at global levels, in order to eliminate the release of these chemicals.

Though not soluble in water, POPs are readily absorbed in fatty tissue, where concentrations can become magnified by up to 70,000 times the background levels. Fish, predatory birds, mammals, and humans are high up the food chain and so absorb the greatest concentrations. When they travel, the POPs travel with them. Therefore, POPs can be found in people and animals living in regions such as the Arctic, thousands of kilometres from any major POPs source.

Some POPs are also considered to be endocrine disrupters, which, by altering the hormonal system, can damage the reproductive and immune systems of exposed individuals.

2.3.2 PCBs, their sources and their destruction

Polychlorinated Biphenyls are a class of synthetic organic chemicals.

Since 1930 PCBs were used for a variety of industrial uses (mainly as dielectric fluids in capacitors and transformers but also as flame retardants, ink solvents, plasticizers, etc.) because of their chemical stability. PCBs are fire resistant, have a low electrical conductivity, high resistance to thermal breakdown and a high resistance to oxidants and other chemicals. When researches in the 1970s found out that these characteristics that made them a popular additive represented a serious threat to human health and the environment, their production was gradually stopped. Adverse effects associated to the exposure of PCBs are damage to the immune system, liver, skin, reproductive system, gastrointestinal tract and thyroid gland.

Around 1.7 million tonnes of PCBs were produced between 1929 and 1989 and a lot of the equipment containing PCBs is still in use somewhere or stocked awaiting final disposal. As PCBs once released into the environment do not break down but travel over long distances and continue to pose health risks to humans, it is important to remove them from use and destroy existing stockpiles.

Existing PCBs can be destroyed through the breaking of their molecular bonds by the input of either chemical or thermal energy. The most common method is high temperature incineration, though other non-combustion methods like dechlorination exist.

While manufacture of PCBs has ceased, the potential or actual release of PCBs into the environment has not, since significant quantities of existing PCBs continue in use or in storage. Electrical transformers and capacitors are one such major source of PCBs.

The extended period of continuing use and the persistence of PCBs, once released into the environment, mean that they pose a threat for decades to come. While most of the chemicals covered by the Stockholm Convention are subject to an immediate ban, the PCBs existing equipment may be maintained in a way that prevents leaks until 2025 (while PCB-free replacements are being introduced).

Many transformers and capacitors use a dielectric fluid based on (PCBs). These products, although having fire-resistant and other properties required for use in electrical equipment, present some major disadvantages.

These disadvantages are linked to the toxic nature of PCBs and their potential contamination with or transformation into dibenzo furans. Negative biological effects have been coming to light over many years. Unfortunately PCBs have already been in widespread use for about 40 years in transformers and capacitors and it is now necessary to put forward practical solutions for eliminating PCBs wherever they may occur.

The Stockholm Convention addresses the production, use, import, export, release of by-products, stockpile management and disposal of the POPs.

Under the terms of the Convention, due to the still widespread reliance on PCB-containing equipment, certain electrical transformers and capacitors, an exception is made to allow continued use of such equipment until 2025.

The first problem that countries with PCB transformers still in operation have to face is how to locate and identify this equipment. A decision will then have to be taken as to when, and how, the contaminated equipment will be managed, reclassified and eventually eliminated.

It may be noted that, besides electrical transformers and capacitors, PCBs have also been used for a great variety of other applications, such as varnishes, waxes, synthetic resins, epoxy and marine paints, coatings, cutting oils, heat transfer fluids, etc. In these other cases, it is not of course possible to recover the PCBs and efforts can be made only to prevent the use of PCBs in such applications in the future.

PCBs are among the most stable organic chemicals known. Their low dielectric constant and high boiling point make them ideal for use as dielectric fluids in electrical capacitors and transformers.

Equipment such as transformers, capacitors and, to a lesser extent, heat-exchangers and hydraulic equipment may contain PCBs or fluids with varying levels of PCB contamination.

For example, PCBs may be found in hermetically sealed capacitors ranging in size from those fitted to fluorescent lights, containing a few grams of PCB, to high voltage units containing up to 60 kg of PCB liquid. Capacitors are maintenance free but may leak at welds. Capacitors contain the lower chlorinated congeners of PCBs, which are therefore more volatile.

PCBs are being gradually phased out for applications in electrical equipment from the early 1980s, depending on the country.

A distinction can be made however in this present context between transformers and capacitors.

Both these types of equipment can contain PCBs. However, only **transformers** can be treated so as to remove the PCBs they might contain, and be prepared for re-use.

Capacitors must generally be destroyed to eliminate the PCBs they might hold, although some technologies allow recovery of some metals before destruction.

Transformers are devices that can increase or decrease the voltage level of electrical current.

Electrical energy is produced in power stations that burn various fuels (oil, coal, gas, etc.) and transform these into electrical energy. This energy is in the form of high voltage electricity that is then distributed to the end-users (factories, homes, mines, railways, schools, etc.), which may be close to or far from the producing power station. The transfer of this electrical energy is made much more advantageously if the voltage is maintained at a high level. Electrical power cables carry electricity at voltages of several thousand kilovolts.

The voltage must be decreased before use, so as to correspond to industrial requirements of a few thousand volts, or to domestic requirements of a few hundred volts. This voltage reduction is achieved using transformers. Every transformer in electrical sub-stations, in streets, in the countryside, on poles, etc., has the role of reducing the voltage.

These transformers must be adapted to the task to which they are assigned. This means that they can be very large, if dealing with high voltages and currents, or relatively small if placed in the last step in the supply chain to serve for instance a single house. Transformers, therefore, vary greatly in their design and size. They nevertheless have the same basic design which is that of a magnetic metallic core around which are wound two sets of conducting (copper) wires.

This structure is placed in a metallic container and is supported in this container usually by wooden struts (which have insulating properties). The two electrical circuits are equipped with inlet electrodes allowing electrical connections to the outside. These electrodes are isolated from the metallic case by ceramic insulators.

Lastly, and more importantly, the empty space inside the transformer casing must be filled with a fluid which will prevent short-circuits and sparking. A transformer, in its final stages of manufacture, is thus filled with an appropriate dielectric fluid, which often is a PCB-base oil mixture. There are variations in the type of structures of transformers and some other metals can also be found, for example aluminium.

Capacitors have in common with transformers the characteristic of possibly containing PCBs.

However, their nature is different in that they are always sealed structures. The question of maintenance is thus not a major issue, as long as the capacitor remains in good condition and does not leak. However, at the end of their life-time they represent the same potential danger like transformers.

Capacitors are devices that can accumulate and hold an electrical charge. The main structure of a capacitor consists of electrical conducting surfaces (thin metallic foils) separated by a dielectric, i.e. non-conducting, material. These surfaces are coils of metallic foil. The dielectric material is usually a dielectric fluid which or may not contain PCBs.

PCB dielectric fluids can be a blend of polychlorinated biphenyl and, for example, trichlorobenzene (TCB). The purpose of the TCB is to reduce the viscosity of the PCB to enable the fluid to circulate freely through the cooling ducts in the coils.

The design of a transformer can give a good indication as to the presence of PCB oils. Many PCB-containing transformers were at one time hermetically sealed. It is important to identify accurately PCB fluids in capacitors and transformers.

The analysis of these substances is generally done in a laboratory using various types of chromatography.

Such analytical tests are indispensable if precise dosages of PCBs are required. Field test kits, such as Chlor-N-Oil can provide fast, on-site screening of PCBs in oils. A more accurate analysis can be undertaken with specialized analytical equipments such as L2000DX, which measures the chlorine content of the oil after destroying the covalent bounds of the PCBs and extracting the chlorine ions into water based buffer. Highest precision in the analysis of PCBs can be achieved by Gas Chromatography.

To conclude the POPs destruction by combustion in incinerators has been the most used technique worldwide during many years in the past. However, due to the threat they present for the environment (combustion produces by-products even more toxic of the waste disposed, like dioxins) the international community has looked for alternatives to replace combustion technologies.

Several new technologies have been developed for improving the existing ones, based on non-combustion principles. The goal is to develop technologies that apply chemical processes for the conversion of the chemical, physical and biological properties of hazardous wastes.

3 METHODOLOGY OF THE EVALUATION

3.1 Purpose and objectives of the evaluation

The tasks of this in-depth evaluation are outlined in the attached Terms of Reference of the mission. (Annex I)

The purpose of a final independent in-depth evaluation is to enable the project stakeholders (Donors, Government authorities, national counterparts, the participating regions and counties, industries, GEF and UNIDO) to take final decisions on possible reorientation of the activities, through the analysis of the achievements and the shortcomings of the project.

The main focus of the evaluation is to assess the current project situation and to evaluate the alternative scenarios and feasibility for the future.

The evaluation process offers the opportunity to the project stakeholders to learn about the possibilities of future re-orientation of the related activities and, in case, reconsider alternative approaches. The evaluation process will provide with lessons and experiences for the eventual future design and implementation of similar projects aiming at building capacities for environmentally sound management.

This independent evaluation was foreseen in the project document, which was endorsed in Bucharest on 11 January 2006 by the General Director of the GEF Operational Focal Point at the Ministry of Environment and Forests.

Further, this evaluation is trying to determine, as systematically and objectively as possible, the relevance, efficiency, effectiveness, impact and sustainability of the project regarding, among others, also :

- The development in the demand/need for PCB related obligations in the country.
- The application of the concept that aims to strengthen an environmentally sound management system (ESM) of PCBs, based on a consensus between relevant government authorities, the private and public sectors.
- Whether the chosen strategies and target groups have been properly selected or should they had been promoted with different strategies or should other target groups have been selected.
- Whether the goals set in the project document and in the work plan have been reached.
- Whether the inputs provided (expertise, training) have been of good quality.
- Whether the activities have been undertaken in a controlled and coordinated manner by protecting human health and the environment from the harmful effects of PCBs.
- Whether a financially feasible management system for safe and environmentally sound phase-out and disposal of PCB and PCB-containing equipment has been put into practice.
- The efficiency of the project coordination.
- Which activities of the project have been the most useful and most successful applied (information, training, technical advice, policy advice…).
- The degree that the elements of the environmental management system have been put into practice in the demonstration areas.
- How the activities of identification, labelling, safe collection, interim storage and disposal of PCBs have been applied.

- How effectively the tangible objectives, such as collection and environmentally sound disposal of 300 tonnes of PCB-containing equipment and the inventory of 8000 pieces of equipment, have been implemented.
- The quality of the Public Awareness activities.
- How well has been spread the awareness on PCBs and on the Stockholm Convention in the environment related organizations of the Government and PCB owners, such as the main electrical utilities, the energy intensive industries, the hazardous waste management enterprises and disposal facilities.
- How the institutional strengthening and capacity building have been implemented and the corresponding guidelines developed.
- To what degree the companies continue implementing the interim storage of PCB-containing equipment.
- The level of the economic and environmental impact.
- Evidence of the application by the enterprises of the safety measures developed by the project as part of the ESM of PCBs document, for avoiding PCB releases from working equipment.
- The degree of influence in the implementation of PCB related legislations.
- How is advancing the gradual elimination of PCB-containing equipment in the demonstration areas.
- How are working the laboratories available for PCB analysis and labelling.
- The present situation and how are operating the facilities upgraded for the interim storage of the PCB containing waste.
- The quality of the professional and managerial competence to sustain the activities.
- Where are the gaps and where are the strengths for the continuation of the activities.
- The arrangements that can be made to strengthen the sustainability of the activities implemented by the project.
- The efficiency and utility of the success indicators as applied by the project activities.

The primary purpose of any independent evaluation is:

- Assessing the achievements against the objectives and the expected results.
- Identifying factors that have facilitated the achievements of the projects objectives, or factors that hindered the fulfilment of these objectives.
- Determining which lessons can be learned from the existing experience, in order to improve the activities in a further phase, with particular regard to the capacity of the structures supported to become self-sustainable.

The Evaluation Team has considered the objectives stated in the Project Document and has analysed the results obtained in the implementation of the activities foreseen.

This report is based on the following:

The Project Document dated on 11 January 2006, indicating the basis and the strategy for the cooperation in this project, which should have focused, according to the signed document, on

"overcome the current barriers, which impede upon the implementation of the PCB-related obligations of the Stockholm Convention in Romania ……..…

…. strengthening of an environmentally sound management (ESM) system of PCBs based on a consensus between relevant government authorities, the private and public sectors and NGOs…….

…..develop a sustainable mechanism to complete the PCBs disposal in Romania……..…….. …..implementing the PCB related obligations of the Stockholm Convention…….. by improving the regulation, increasing the awareness, establishing a financial mechanism for phasing out and disposal of PCB and PCB wastes, demonstrating the system at selected regions, training local specialists in different aspects of PCB management……..……..

……. implementation of the ESM system in selected demonstration areas will lead to a) developing a detailed PCB inventory of the electrical equipment, articles and wastes, b) upgrading laboratory capacity to analyse PCBs in oils and soil, c) establishing a database on the electrical equipment, which are in the most critical condition, d) establishing proper interim storage locations for equipment withdrawn from use, and e) reducing risks for environmental pollution via phase-out and disposal.……..…

…..provide a replicable model of cooperation between government, public and private entities in addressing global environmental challenges."

The above mentioned activities should be complemented by the project with training, information, capacity building, policy advice, etc.

- The documentation provided by the project parties.
- The Project Progress Reports, which provide the executing agency, the management of the project and the evaluators with a valuable tool regarding the self-appraisal of the implementing parties of the results obtained and of the difficulties or obstacles encountered.
- Discussions with the UNIDO Project Manager, the National Project Coordinator, the national consultants, the national counterparts and the staff of national institutions.
- Meetings with national counterpart institutions, municipalities and high-ranking officials.
- Visits to some target beneficiaries and meetings with their managers, discussing the related problems, technology transfer and its application and, finally, their global experience with the project.
- Analysis of the questionnaires prepared by the Evaluation Team and answered by the counterparts.
- The issues have been analysed in an impartial and objective way, which should be helpful to the responsible authorities and project staff to improve their performance.
- The issues have been presented at a final presentation meeting in Bucharest and have been discussed with the parties involved in a lively session.
- The Evaluation Team has attempted in this report to give a comprehensive image of the activities, discussing the issues in a way, which should be helpful for the responsible authorities to decide how to orient the activities in the future.

3.2 Composition and timetable of the mission

The observations and findings of the Evaluation Team are the result of this in-depth evaluation carried out in their own capacity. The views and opinions of the team do not necessarily reflect the views of the Government of Romania or of UNIDO.

The mission team was composed of the following members:

Mr. Mario Marchich, international consultant, Team leader, specialized in evaluation of international technical assistance cooperation projects.

Mr. Szabolcs Fejes, chemist, familiar in evaluating achievements, success and shortcomings of technical cooperation projects dealing with the management of PCB containing equipment, PCB applications and disposal of electrical equipment

Mr. Radu Cadariu, Engineer, national consultant in hazardous waste treatment and environmental protection.

This tripartite composition of the team has assured uniformity, impartiality and the guaranty that the views of the concerned parties have been considered under an informed point of view.

The mission assembled in Timisoara to start its work. The places visited in Romania to complete the evaluation have been: Timisoara, Filiasi, Craiova, Slobozia, Braila and Bucharest.

The agenda of the evaluation mission is contained in Annex II.

At the end of its work in Romania, the evaluation mission has presented in Bucharest on Thursday 27th May 2010 at the Ministry of Environment and Forests its draft findings and related recommendations at a general debriefing meeting with the participation of the national parties concerned in the implementation of the activities.

The presentation has been followed by interesting and fruitful discussions with the participants. The results of these discussions and the comments made by the participants have been taken, as far as possible, into account in this report. The list of the places visited and of the persons interviewed in the framework of this evaluation is in Annex III.

Figure 2: Left photo: Bucharest: The Evaluation Team presenting the conclusions and recommendations to the Ministry of Environment and Forests. Right photo: From the left: Ms. Doina Frantz, General Director of Authority of Sectorial Operational Program, Ms. Maria Elena Teodorescu, Head of Technical Assistance Unit, Authority of Sectorial Operational Program, GEF Operational Focal Point and Ms. Adriana Stoica, counsellor, Pollution Control Directorate.

3.3 Evaluation Terminology and Glossary

There is a generally accepted international evaluation terminology. For this reason, in order to help the readers, it is useful to give here some definitions/explications of the meaning of the words used in this report.

This terminology corresponds in large part to the terminology used in the evaluation methodology followed by the major international institutions (UN, DAC, EU, OECD, OSCE,..) involved in projects of technical cooperation.

Below are reported the explanations of the terms concerning the evaluation, its concepts and the terminology used:

Terms	**Explanation of Terms**
Accountability	Obligation of the project managers to demonstrate that work has been conducted in compliance with defined responsibilities, rules, standards and performance expectations. For the evaluators it connotes the responsibility to provide accurate, fair and credible reports and assessments.
Activities	In the context of a project the activities are the main actions implemented to reach the foreseen outputs.
Appraisal	An assessment of the relevance, feasibility, design quality and potential sustainability of a project prior to the decision of approval and funding.
Appropriateness	It is the tailoring of the activities to the local needs, which contributes in increasing the ownership, accountability, and cost-effectiveness of the project accordingly. **Appropriateness,** together with Relevance is a complementary criterion used to evaluate both the wider goal of the intervention and its specific approach in terms of how it responded to the local context and needs.
Assumptions	Conditions that are necessary to ensure that the planned activities will produce the expected results and that the logical link (effect – relationship) between the different levels of the project results will occur as expected, if not unexpected situations will happen.
Audit	Fiscal, administrative and procedural function relating to the overall policies and regulations of the Organization. It evaluates adequacy and effectiveness of the management control systems.
Baseline	Facts about the condition of a country's situation and the

Terms	Explanation of Terms
	performance of target institutions and beneficiaries, prior to the provision of the services given by a project/programme.
Baseline Data	Data that describe the situation to be addressed by a programme or project and that serve as the starting point for measuring the performance of a project/programme.
Beneficiaries	Individuals, enterprises or organizations/institutions, whether targeted or not, that benefit directly or indirectly from the project.
Best Practice	Operational practices that have proven successful in particular circumstances. Are used to demonstrate what works and what does not work and also to accumulate and apply knowledge.
Cause and Effect of environmental Aspects	**Causes** of environmental aspects are the direct consequences at plant level (in terms of emissions or natural resources used), while **Effects** are their impacts on the eco-socio environment
Clients	The counterparts in the field receiving the services within the framework of a project/programme.
Client Feedback	Feedback provided from clients and partners receiving the services. The method is used for involving the counterparts in the evaluation process.
Coherence	Assessment of coherence should focus the extent to which policies of different actors are complementary or contradictory. This may involve any type of policy such as on promoting participation, capacity building, disposal of wastes, possibilities of generating revenues, all in relation with the environmental protection. Evaluating the coherence of the project is of particular importance when there are a number of actors involved in the response, as they may have conflicting mandates and interests.
Conclusions	Conclusions and findings outline the factors of success or failure of the project under evaluation, with special attention paid to the intended and unintended results, in order to point out strengths or weaknesses.

Terms	Explanation of Terms
Cost- Effectiveness	The ratio between the cost faced and the result obtained.
Criteria	Qualitatively expressed "Indicators", when it is not possible to use quantitative data.
Critical assumptions	In the context of the logical framework refer to the general conditions under which a development hypothesis will hold true or refer to the conditions which are outside the control or influence of the implementing parties and which are likely to affect the achievement of results.
Data	Specific quantitative and qualitative information or facts that are collected
Data Collection Tools	Methodologies used to identify information sources and collect information during an evaluation.
Design	It is an analytical tool for the assessment and description of a development project/programme in support to the expressed needs of the counterparts and beneficiaries.
Donor	Is the funding Organization or Government whose role in the evaluation exercise is to participate in the evaluation, ensuring together with the executing agency, through the lessons learned, the necessary feedback on programme improvements, reorientation and funding.
Effect	General term to indicate what is changed by the project. It shows what the outputs have produced. The change resulting from the production of the outputs.
Effectiveness	The extent to which the outputs of the project are used to achieve the purposes. The extent to which stated intervention objectives are met. Effectiveness is therefore linked to evaluation of impact and long-term effects of the intervention. Implicit within the criterion of effectiveness is timeliness.
Efficiency	The relationship between the inputs utilized and the outputs produced, both in terms of quantity, quality and

Terms	Explanation of Terms
	timeliness. It measures the outputs (qualitative and quantitative) achieved as a result of inputs. Generally requires comparing alternative approaches to achieving an output, to see whether the most efficient approach has been used. The assessment of efficiency measures how economically the inputs (human, financial, technical and material resources) were converted into outputs.
Evaluation	Analytical and objective feed-back on outputs, outcomes and impact of the implemented Technical Cooperation, used for accountability towards management, donors and counterparts, as well as for learning of lessons. Evaluation results are used to improve the quality of design and delivery of current and future activities.
Evaluation Feedback	Dynamic process which involves the presentation and dissemination of evaluation information, in order to ensure its application into new and existing Technical Cooperation activities. Observance of this process is ensuring that lessons learned are incorporated into new operations.
Goal (also Purpose, or Mission)	Endeavours at general level.
Impact	The extent to which the improved performance of the counterparts and the solution of the critical issues have produced a positive effect (in quantity and quality) on the target beneficiaries and on the overall development of the country. It means the changes achieved in the targeted beneficiary sector. It is the result of the long-term effect of the project as described in the development objective. However, changes may take months or even years to become apparent.
Independent in-depth evaluation	Independent assessment of performance, outcomes and impact, carried out by independent evaluators.
Indicator	Quantitative or qualitative variable that provides a simple and reliable basis for assessing results and/or performance of the project.
Inputs	Financial, Human, and Time resources that are put at the disposal of the project to implement the activities and

Terms	Explanation of Terms
	produce the outputs.
Lesson Learned	It is a generalization based on the results of the evaluation that abstracts from a specific circumstance to a broader general situation. Normally, the lessons highlight strengths or weaknesses in formulation, design and implementation that affect performance and results. If lessons are to be learned from evaluations, assessment of relevance and appropriateness should involve the examination of **why** the interventions made by the project are relevant and/or appropriate in some cases, and not in other cases.
Logical framework	Management tool used to design technical cooperation projects/programmes. It identifies inputs, activities, outputs, results and their causal relationships. It includes indicators and the assumptions or risks that may influence the success or the failure in achieving the project/programme objective(s).
Milestones	Important events or concrete results, marking the beginning or progress or end of activities and used to keep track that the activities are implemented as planned and according to the work plan.
Monitoring	Continuing implementation review function to provide the main stakeholders and the management with early indications of progress or lack thereof in the achievement of outputs and objectives.
Objective	It is used as general term for aiming at results at different hierarchical levels (General development objective, immediate objective, specific objective, etc.). It will help the beneficiary in achieving the selected long-term development objective(s).
Outcome	Effects related to target groups/beneficiaries assisted, showing the positive changes obtained by the counterparts in their performance and behaviour. Indicates their capabilities to have benefited of the assistance received.
Output	The final product in terms of activities executed, applying the input resources. It shows the improved

Terms	Explanation of Terms
	capabilities of the Counterparts, after having received the assistance. The expected improved situation of the counterparts (government, institutions, pilot enterprises).
Performance	The extent to which the project has produced valuable and sound outputs and their contribution to the final impact. Both, efficiency and effectiveness can be considered as measures for the performance of the project.
Project/Programme Document	A document that explains in detail and following the logical framework, the context, objectives, expected results, inputs, activities and budget of a project/programme.
Quality Criteria	Evaluation criteria applied in order to assess project/programme performance. (Relevance, Efficiency, Effectiveness, Impact, Sustainability)
Recommendations	Advisory proposals (not binding or mandatory), aiming at enhancing the quality and the effectiveness of the project, redesigning objectives or suggesting re-allocation of resources. Any recommendation should be linked to a conclusion and should be directed to the party responsible for taking the respective action.
Relevance	The extent to which the project is consistent with the problem area identified in relation to the country's development goals and constraints and needs of counterparts, beneficiaries and services/expertise. Relevance is concerned with assessing whether the project is in line with local needs and priorities, i.e. the quality of the problem analysis and the project's intervention logic and logical framework matrix, appropriateness of the objectively verifiable indicators of achievement. (**See also Appropriateness**)
Result	General term for the effects that result from the application of the project inputs. It indicates the performance of the project.
Self-evaluation	Process for continuous improvement by project managers and counterparts, aiming at reviewing progress and agree on reorientation requirements.

Terms	**Explanation of Terms**
Sustainability	Capability of the counterpart (Institution or enterprise) to maintain and further develop outputs and outcomes produced with the support of the project and/or to adjust them in order to ensure the continuation of the benefits to the target beneficiaries, when the assistance of the programme will end.
Target	A specific objective. The mark at which is aimed by the activities of the project.
Target Groups	The main beneficiaries from the programme or project that are expected to gain from the results.
Terms of Reference	Definition of purpose, scope, method, team composition and timetable of the evaluation.

4 ANALYSIS OF THE ACTIVITIES AND FINDINGS

4.1 Context, Concept and relevance of the project

The project document was developed on the basis of the National Implementation Plan and discussions with national experts and relevant governmental institutions in 2005. The NIP was endorsed in the same year and concluded that PCB management related matters are one of the top priorities of the NIP implementation. PCB-related activities have already been started in the country when Romania started to prepare for its accession to the European Union, particularly in 2000.

The NIP development was coordinated by ICIM and the project aimed at utilizing this capacity, which was developed by GEF assistance.

The NIP created capacity on PCBs at the Governmental level, which the project aimed to transfer to the regional and local levels.

When the project proposal was written and approved there was one public company, Electrica S.A. entrusted with a national monopoly in the electrical sector. Electrica S.A. owned approximately 80% of all electrical equipment of Romania, covering the electricity generation, transmission and distribution. The other 20% of the electrical equipment was in private ownership of medium and large industrial facilities. The project aimed to work with Electrica S.A and assist the company in undertaking the inventory of PCB-containing equipment, particularly transformers.

At the time of starting the project the private sector involved in the management and disposal of PCB-containing equipment lacked the appropriate technologies and expertise for the environmentally sound of PCB wastes. Their activities concentrated on exporting these wastes abroad. The price of PCB disposal was approximately 5.5 US$, far too high for the owners. Owners of PCB-containing equipment were holding, storing the equipment, waiting for assistance or support from the Government. The project planned to assist the private sector and the Government sector in finding the most appropriate solution for speeding up PCB elimination.

In this regard context in which the project was implemented was consistent with the objectives of the beneficiaries' requirements, country needs and priorities, stakeholders and partners.

Strong coherence was observed with on going initiatives. The project has complemented the PCB inventory development activities of the Local Environment Protection Agencies. It supported the private sector in investing on BAT/BEP in the field of PCB management, thus creating capacity in Romania to treat PCBs locally. It also created awareness on the PCB issue at owners of PCB equipment. New technologies for PCB management resulted in lower price for disposal that eventually boosted PCB owners to speed up the disposal of their equipment instead of keeping them in storage.

The project has appropriately analysed the barriers Romania was facing related to the management of PCBs. On this basis the logic of the intervention was correct. Institutional capacity was strengthened at all key implementation partners, i.e. the Government, ICIM, Local and Regional Environment Protection Agencies of the demonstration areas, PCB management enterprises and owners of PCB-containing equipment and wastes. This capacity for managing PCBs in an environmentally sound manner resulted in meeting the project objectives.

The intervention was logical; the activities were grouped into five outputs, which were inter-related.

The first output established the project management structure, then the key implementing partners were strengthened and the guidelines for environmentally sound management of PCBs were developed. The ESM system, in output number three, was field-tested in three demonstration areas.

The results of the implementation of the ESM system in the three demonstration areas have been extrapolated to the whole country in output number four culmination in the countrywide inventory estimate and PCB phase-out plan.

Project management assured adherence to the project document through its continuous monitoring in output number 5.

The project document included a logical framework analysis, which set objectively verifiable indicators of achievement. The stated objectives of the project have correctly addressed the identified barriers.

4.1.1 Extent to which the barriers have been removed

The extent to which the identified barriers of the project document have been addressed by the project is presented in the following table:

Barriers existing at the beginning of the project	**Extent to which the problem has been faced by the project**
The private sector was mostly reluctant to implement the PCB containment, phasing-out and disposal measures.	The project completely removed this barrier by putting in place BAT/BEP for local pre-processing and disposal of PCB wastes at the demonstration areas. Three enterprises have invested in upgrading their technologies in this regard. It resulted in significant reduction in the PCB disposal price (from ~5.5 US$/kg to 1.2 US$/kg). This consequently boosted the amount of PCBs disposed. The project target of 300 tons to be eliminated was by far exceeded. At the time of evaluation a total of 1,166 tons of PCBs have been eliminated.
The NIP identified that many owners of PCB-containing equipment did not have the established procedures and safety measures for servicing, maintenance and disposal of the equipment.	The project has developed guidelines for the environmentally sound management of PCBs. The guidelines are waiting for official approval by the Ministry of Environment and Forests. These guidelines were implemented in the selected demonstration areas.
The condition of the electrical equipment and wastes storage locations and their maintenance, according to the project document, were in many instances unacceptable.	The project has selected and strengthened an operator in each of the three demonstration areas. These operators after the implementation of the ESM system for PCBs at their premises, work according to international standards. These operators have collected 1,166 tons of PCB-containing wastes from PCB owners, assuring that PCB release into the environment is avoided.

Barriers existing at the beginning of the project	Extent to which the problem has been faced by the project
	The amount is higher than expected, however this barrier is still present, since project activities were for demonstration and did not cover the whole country.
The awareness of PCB owners on environmental and occupational safety issues regarding PCBs was generally low.	Expert teams of ICIM have provided trainings and assistance for inventory taking and management of PCBs for 338 enterprises. Local and Regional Environment Protection Agencies in the demonstration areas have also been trained. In this regard the project met the expectations.
PCB owners lacked the financial resources to pay the total costs of disposal of PCBs.	Project planned to utilize the National Environmental Fund to subsidize the cost of PCB disposal. During the implementation the project management decided to take another course and facilitate private sector involvement in establishing PCB disposal technologies. In this regard an incinerator was upgraded with oxygen injection to the secondary chamber so that PCBs could be incinerated in an environmentally sound manner. A sodium based dechlorination technology was also built to dechlorinate PCB-containing oil and PCB decomposition by bacteria was also introduced. This resulted in radical decrease in the disposal prices. PCB owners accepted and welcomed this approach since the price reduction in PCB disposal far outweighed what they could have received from the National Environmental Fund. In this aspect the project has completely removed this barrier.
There was a lack of cost-effective analytical capacity to test PCBs in transformer oils.	Three laboratories have been strengthened by the project which is coherent with the project document. L2000DX equipments were provided for the fast and cost-effective analysis of PCBs in oils. Capacity in Gas Chromatography is also available for high precision analysis of PCBs. The project has completely removed this barrier.
Hazardous waste management companies could only export PCB wastes abroad since they were lacking the necessary technologies and expertise in this regard.	As was stated earlier, three technologies have been upgraded/developed for the disposal of PCBs. Pre-processing of the PCBs wastes and cleaning of the empty carcasses have also been

Barriers existing at the beginning of the project	Extent to which the problem has been faced by the project
	established. Through the disposal of 1,166 tons of PCB wastes the practical expertise in this field has also been created. The project has removed this barrier.
Due to the lack of appropriate countrywide inventory of PCB-containing equipment, Romania was lacking the necessary information a) to undertake its regular reporting as per the SC and 2) to develop a comprehensive PCB phase-out plan.	Countrywide inventory on phased-out and waste equipment has been developed. The database is kept with the National Environment Protection Agency. PCB owners have to file elimination plans at LEPAs, which regularly monitor the implementation of such plans. ICIM has developed a transformer database, which includes in-use and phased-out equipment. This database is based on chemical analysis of the oil samples taken from the equipments. This inventory is complementary to the NEPAs database as it contains information on the in-use equipment. In this regard the project met its target, but the barrier could not be completely removed since its inventory related activities could not cover the whole country.

4.1.2 Quality of stakeholders and target groups

The primary objective of ICIM during the communist period, as a national research institute, was to provide research and development services for the Government and public enterprises. With these activities ICIM was one of best research institution at that time in Romania. The organization was financed by the state budget. Among ICIM's duties was the development and pilot testing of environment related monitoring activities. From the nineties, after the privatization ICIM started to provide research and development for the private sector as well, though it's fame has started to fade since due to the restructuring of the economy in Romania, they received fewer contracts from the public and private sectors. Today ICIM is Governmental researcher institution under the coordination of the Ministry of Environment and Forests entrusted with environment related research and development. New environment related monitoring methodologies are also developed here. It is financially independent and has developed good relationship with the industries. In this regard the selection of ICIM as the execution agency for the project was appropriate.

The project has selected three private enterprises, engaged in hazardous waste management, in three demonstration areas.

In the Western demonstration area PRO AIR CLEAN S.A. a small hazardous waste incinerator facility was selected as the interim storage location for the region. PRO AIR CLEAN was established in 1998. Its major shareholder is the German-Swiss company CHINOX AG, which is a European leader in ecological incineration and has operating units in Austria, Belgium and Hungary. PRO AIR CLEAN has built the first incinerator in Romania.

Among the services offered there are:

- Collection, transport and elimination by incineration of industrial, medical and toxic wastes.
- Technical assistance in elaborating transport documentation in accordance with the environmental legislation.
- Decontamination of industrial polluted sites.
- Analytical determination of emissions in the environment (water, air, soil, noise).
- Laboratory analysis for determining the characteristics of solid, liquid or gaseous waste.

The incineration plant built in Timisoara by PRO AIR CLEAN belongs to the last generation and operates according the European standards. The technology utilized allows the incineration of any solid and liquid waste that can be eliminated in this way. This technology is based on incineration program that exploits the calorific value of the waste and an efficient gas scrubbing method.

The company is using the best available methods to protect the health of people and environment. The plant is totally automatic and the personnel is qualified and trained to deal with the equipment and the hazardous materials. The emissions and all operating process are under continuous monitoring during the entire incineration cycle.

PRO AIR CLEAN establishes with the client the modality for the waste collecting, packaging and labeling for safe transportation and incineration. The waste transfer is based on charts and specialized means of transport that are licensed according to the law.

The company is providing the sanitary units that generate waste of biological contamination risk, with special packaging for safe waste collection and transport. The personnel is qualified and periodically tested and updated for the best methods for waste collection, transport and treatment operations, as well as for emergency situations. The area of the company is under continuous surveillance and on-line alert. The laboratories of PRO AIR CLEAN are very modern and are designed to analyze waste, emissions and other important environmental factors. The activities of the company are developed all over Europe in the field of ecological waste management and it promotes a change in the mentality regarding waste elimination services and the strict enforcement of the legislation.

Figure 3: The facilities of PRO AIR CLEAN S. A.

The waste categories PRO AIR CLEAN is treating are: Industrial waste, medical waste (hospital, medical practices, polyclinics) and PCB containing waste (electrical waste, such as capacitors, transformers, oils, etc.).

DECOMEDIU S.R.L.[1] was selected to host the interim storage location for the central demonstration area. The Evaluation Team had not the possibility to meet some representatives of the management of this company. The interim storage of the company in Filiasi (Craiova) has been visited by the Evaluation Team accompanied by the Chief Operator and Controller of the interim storage of the enterprise. The company is located at the industrial zone of the former transformer manufacturer Filiasi. DECOMEDIU S.R.L. has recently entered the hazardous waste management business.

They have invested in establishing the first PCB dechlorination plant in Romania. Their technology is stationary, with a capacity of 1.5 tones per batch, approximately 3 tones/day supplied by ECOLSIR Italian company. The process is based on elemental sodium, which strips off the chorines from the PCB molecules. The first step is heating one batch of PCB-contaminated oil to 130 ^{0}C under vacuum, to completely de-water the oil. In the meantime the sodium is dispersed in mineral oil in an autoclave and heated up to 130 ^{0}C. Then the oil and the reagents are pumped to the reaction chamber, where the de-chlorination takes place under vacuum. The oil from the reaction chamber is drained off to control the PCB concentration.

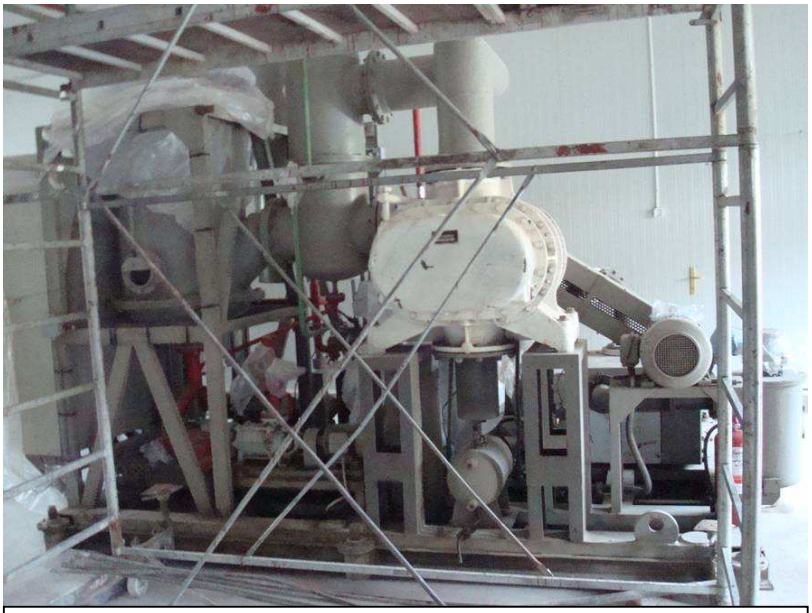

Figure 4: Sodium dechlorination technologiy of DECOMEDIU S. R. L.

Approximately after an hour the bentonite is added to the reaction chamber, which is an additive for filtration of the sludge and sodium chloride. The final step is the filtration, when the sludge is separated form the regenerated oil. The total investment by the company was approximately 230,000 Euro. During the last year of the project implementation they have formed a joint-venture with Set Car S.A. and the technology was re-located to Braila, where Set Car has its main facility.

The Team has also seen there some of the equipment provided by the project and was informed that the company is discussing the possibility to conclude a cooperation agreement with Set Car, at which premises we saw other equipment in a hangar loaned to DECOMEDIU and which at the time of the visit was not in operation.

Regarding the Eastern demonstration area the interim storage location was established at Set Car S. A. Set Car was established in 1994 as a joint stock company with entirely Romanian private capital. Starting 2000 it developed a range of services aiming at solving the environmental issues in carrying out a wide range of activities for collection, transport, temporary storage and disposal of hazardous wastes, such as: equipment with PCB, discarded chemicals, pesticides, galvanic baths, sludge contaminated with mercury or other heavy metals, solvent based waste, adhesives paints, emulsions, petroleum and asbestos waste.

1 Information on DECOMEDIU was provided by the NPC, since the Evaluation Team could not meet the director of DECOMEDIU S.R.L.

The environmental activity developed by Set Car is completed also by services for the decontamination from fuel tanks, fuel warehouses, galvanic sections up to big chemical plants.

Set Car is collaborating with important Romanian companies which need the services they supply. It is supplying full services to solve environmental issues in respect of:

- Physical-chemical analysis to identify unknown wastes;
- Designing facilities for disposal of specific hazardous wastes;
- Authorization to ADR transport (transport of dangerous goods on the roads European agreement);
- Temporary storage and final disposal of hazardous wastes.

Set Car possesses trained human resources consisting of experienced specialists in handling with a wide range of hazardous wastes, technically appropriate and modern equipment that gives the possibility to face environmental issues of big complexity.

The capability in solving environmental issues is also assured by implementing the integrated Quality Health and Safety Management System, certified by the Standard Bureau VERITAS of London.

Transport of hazardous wastes is assured by own rolling stock consisting of modern vehicles properly equipped and authorized for the transport of hazardous wastes on the roads.

For the waste storage Set Car has built 12 modern warehouses with a total capacity of over 4000 tons endowed with mechanical loading-unloading machines, surveillance and alarm systems and own disposal facilities.

Set Car has established its own laboratory, authorized and equipped at the state of art devices, for chemical analysis for waste, in order to identify and determine the optimal methods for their neutralization. The laboratory endowment enables the determination of concentration for heavy metal, oil products, PCB compounds from waste waters, sludge and soils.

When fast solution for chemical analysis is required, Set Car has also designed a mobile laboratory.

The management of PCB wastes, as a result of high toxic degree of the PCB components, is based on the following principles: PCB collection includes warehouses and installations totally separated from the other warehouses for hazardous waste of the company. The packaging used for the transport of PCB containing equipment is not used for other types of waste. The mechanical loading-uploading equipment is used for handling only PCB equipments.

Figure 5: Set Car S. A. facilities in Braila

The working personnel is trained in packing and storing PCB containing equipment at the facilities available in the premises of Set Car for disposal and dismantling PCB oil transformers, for collecting oil samples and performing analysis.

Other important aspect of its activity is the advice given to the customers regarding correct storage of PCB equipments. The customers do not have necessary knowledge and training on handling and storage to avoid environmental contamination. Improper storage may increase the financial costs of the disposal.

The project gave to Set Car retention tank, lift truck, electrical pumps and ventilators, reagents for hazardous liquid substances, metal containers for the solid hazardous wastes and a computer.

The collaboration agreement with ICIM signed in 2008 assures that: safety increased when handling and transporting PCB equipment by using the materials provided by the project.

Further, a better soil protection has been assured through the metal floor provided by the project and that does not allow the PCB oils to flow into the soil.

The work climate for the personnel has been increased using exhausters and independent breathing system with mask, also provided by the project.

They have started local processing of the wastes therefore they had to strengthen their laboratory. They mix for example the acids with the alkaline solutions thus neutralizing some of the wastes. Concerning PCBs they remove the PCB-oil from the equipment. High concentration PCBs (>500ppm) are sent to Germany for disposal. Oils with low PCB concentration (<500ppm) are locally processed. They have several autoclaves where PCB-containing oils are treated biologically. The PCB concentration level is constantly checked and finally removed from the autoclaves.

Since the biological treatment takes more time than chemical processes, they have formed a joint venture with DECOMEDIU S.R.L. and transfered their sodium based dechlorination technology to Braila. The technology was just being assembled at the time of the evaluation.

The Evaluation Team concluded that the selection of the demonstration areas and the quality of the enterprises involved in the project for interim storage of PCBs were good.

To sum up the UNIDO/GEF project has been a big success developing in the three selected areas, through the support to these three private pilot enterprises the activities for collection, transport and disposal of PCB equipments and increasing safety for people and environment in general. The deadline imposed by the Stockholm Convention and which has led to a considerable increase of the PCB equipment to be disposed, has increased the importance of this project.

The Evaluation Team in this context would like to bring to the attention of the management of the project that in the future, direct support (through equipment and materials like reagents) to individual private enterprises should continue to be strictly limited to those taking part in a pilot scheme for demonstration purpose, (like in the case of this project) to avoid the risk of market distortions.

The electrical sector is has gone through a major change since 2007. The sole electricity provider Electrica S.A. has been split into several parts and was privatized. Therefore the initial plan of collecting 80% of the samples from Electrica had to be re-evaluated. The selection of Electrica S. A. at the time of writing the project document was appropriate, but over the time the implementation environment has changed. The project tried to involve the newly privatized companies, but they were not interested in the project. In this regard the National Environment Protection Agency (NEPA) provided good assistance through the LEPAs (Local Environment Protection Agency). The NPC had contacted them for the list of PCB owners, and then these owners were directly contacted. These local stakeholders were in most cases very much interested in the project and provided support for the inventory team in collecting samples and labelling their electrical equipment.

The cooperation between ICIM and NEPA added significant value to the project. The National Environment Guard participated in the Steering Committee of the project and conducted 29 inspections on PCB related matters in 2009. It would, however, be more appropriate if they

would have been participating members of the inventory teams having direct authority to enter and inspect the industrial facilities.

4.1.3 Stakeholders' ownership

ICIM, as the key executing partner of UNIDO, had strong ownership of the project. The managerial infrastructure for the implementation was put into place before the project implementation agreement was officially signed. This ownership remained over the course of the implementation, although the leadership of ICIM has changed many times.

Figure 6: Meeting with the representatives of the REPA of Craiova

LEPAs and REPAs of the demonstration areas were also very committed to the project. The activities assisted them also, especially in monitoring the self-reporting of PCB-containing equipment of the PCB owners and in controlling how they implemented their PCB phase-out plans.

Private stakeholders, especially the three operators, were also important partners of the project, since the activities increased their competition on the market and provided good opportunities to find new customers. In this regard they have also undertaken significant investments.

The PCB owners were also very much interested in the project, since, due to the larger competition and better technologies, the PCB disposal prices reduced drastically, which eventually led to the increased amounts for disposal.

4.2 Project strategy

The objective of the project was to put in place an Environmentally Sound Management System for PCBs and pilot test the ESM system in three selected demonstration areas. The planned outcome of the project was to achieve PCBs release reduction during the management of PCB-containing equipment, to minimize human exposure to PCBs and to accelerate the PCB disposal operations in the country.

The project aimed to achieve these objectives and outcomes by putting in place or strengthening legislations concerning the sound management of PCBs. Institutional strengthening was also planned to create the necessary laboratory capacity that can assist in identifying and labelling PCB-containing equipment. The project has engaged in this regard the capacities of ICIM, which is a research institute in the field of environment and water management. ICIM has expertise in POPs since the Government had entrusted this organization with the development of the NIP for the Stockholm Convention.

UNIDO provided the necessary international expertise for providing training and guiding ICIM in developing the Environmentally Sound PCB Management System. UNIDO also facilitated the implementation of the ESM system in the three selected demonstration areas through

international experts. Technical activities of the implementation were undertaken by Expert Teams. The Expert Team members were trained by the Chief Technical Advisor before they started their activities.

The concept of implementing the ESM system in three demonstration areas of the country before its subsequent approval by the Ministry of Environment and Forests was sound. The ESM system, after its field test, could be revised and any unforeseen errors corrected.

The project has included the LEPAs and REPAs of the selected demonstration areas in the operations, especially in the inventory taking activities. With this approach it has built on the available infrastructure and capacity of the Government, thus utilized the international financial resources wisely.

The inventory exercise was undertaken by the expert teams of ICIM, who were accompanied by the LEPA personnel. This approach was not foolproof, since LEPA does not have authority to enter the enterprises and undertake inspections. In this regard the inclusion of the National Environment Guard (NEG), which has the authority for inspections,, in the teams would have been more appropriate. This was requested by the NPC in writing, but no official reply was received. During the meeting with the Evaluation Team, the NEG stated that they had undertaken 29 inspections in 2009 and the same amount of inspections are planned for 2010.

The project initially planned to utilize the National Environment Fund for subsidising the disposal costs. This option could have been appropriate for the objectives of the project, but it would not have been sustainable, especially if the resources of the fund are depleted. The project has altered in this aspect from the project document and instead of subsidising the disposal costs, it concentrated on strengthening the local disposal technologies, thus achieving significant reduction in the price of disposal. This approach was more sustainable and less bureaucratic than engaging the National Environment Fund. The initial target disposal target of 300 tons of PCBs has been exceeded by almost four times.

The project implementation strategy was sound. The implementing agency, UNIDO, has signed an agreement with the Executing Agency, ICIM, for undertaking the project related activities. ICIM has appointed a National Project Manager for the daily management of project related activities.

UNIDO in consultation with ICIM has appointed an International Chief Technical Advisor (CTA). The CTA provided technical assistance to the executing agency, the National Project Manager and the technical teams. Project related decisions were undertaken by the Project Steering Committee. The PSC had six meetings over the course of the implementation. Expert teams and the operators have reported to the NPC on their activities.

The project document included a logical framework, which provided a sound and objective tool to monitor the implementation. Project achievements have been evaluated against the logical framework during this final evaluation. The detailed analysis of the achievements is included in the “rating project performance” chapter of this report.

The duration of the project was planned to be two years. The cooperation agreement between UNIDO and ICIM as executing agency is dated 31st November 2007, although the activities have started in June 2006, with putting in place the project related management and coordination, as well as forming the Project Steering Committee.

The project has started with some delay due to the negotiation with ICIM on the terms and conditions of the implementation. The discussions concluded that the UNIDO should have a direct involvement in subcontracting national experts and controlling the expenditures.

Therefore, a subcontract was signed between the Implementing Agency and the Executing Agency. National Experts were hired by UNIDO from ICIM through reimbursable loans, or contracted directly by UNIDO. Certain expenditures were directly paid by UNIDO through the local UNDP office. All equipment procurements were also undertaken directly by UNIDO.

The technical activities started officially in January 2008, which was to a certain extent a failure, since due to the cold weather and heavy snow, the expert teams had difficulties in undertaking the inventory exercise, especially in remote areas.

At the end, although the project exceeded its timeline, the budget was not overspent.

4.3 Inputs and budget

4.3.1 Financial inputs

The project co-financing, according to the project document, was planned at US$ 1,020,000, of which US$ 800,000 (in cash) was a contribution from the owners of the PCB-containing electrical equipment and PCB wastes. ICIM has collected at the time of writing the proposal co-financing letters from the PCB-owners. These letters indicated the willingness of PCB-owners to provide financial resources for the disposal of their PCB-containing wastes on the condition that the project subsidises approximately fifty percent of the disposal costs. As it was mentioned earlier, the project did not subsidise the disposal costs, but assisted the waste disposal operators in reducing their disposal costs.

The Evaluation Team visited four out of the 339 companies involved in the exercise: Colterm power plant, ELBA lighting industries, GUBAN shoe factory and Transelectrica - Timisoara, in order to discuss their views regarding the change of the project implementation concerning the way how co-financing was channelled.

The representatives of these PCB owners stated that they gained more through the reduction of PCB disposal prices from approximately 5.5 US$ to 1.2 US$, than what they could have gained whether the project had subsidized with fifty percent of the disposal costs.

During the evaluation of the project performance the cost of disposal paid by the PCB-owners was not taken into consideration for the calculation of the financial inputs and co-financing to the project. The investments, however, by the operators of the demonstration zones in upgrading their facilities and increasing their performance, were considered as co-financing of the implementation. Total investment in this regard was calculated in approximately 1,573,000 US$.

PRO AIR CLEAN has developed a unit for opening capacitors and washing the carcasses with perchloro-ethylene in a closed-loop cycle. The solvent is distilled and re-used; PCBs are collected and drained off from the autoclave. Solid parts after the washing process are incinerated; metal parts are recovered afterwards and are sold.

They invested in an oxygen injection system to the secondary combustion chamber. With this investment they can incinerate highly chlorinated chemicals, such as PCBs. They have stopped shipping pure PCBs to France, since it is more economical to eliminate the waste in their upgraded facility. Total investment cost is approximately 559,000 US$ in the area of PCB management and disposal at their facilities.

According to the NPC and earlier progress reports, DECOMEDIU S.R.L., which hosts the interim storage location for the central demonstration area, has invested approximately 299,000 US$ in establishing the first PCB dechlorination plant in Romania. Their technology is stationary, with a capacity of 1.5 tons per batch, approximately 3 tons/day supplied by the ECOLSIR Italian Company. The process is based on elemental sodium, which strips off the chorines from the PCB molecules.

The first step is heating one batch of PCB-contaminated oil to 130 ^{0}C under vacuum, to completely de-water the oil. In the meantime the sodium is dispersed in mineral oil in an autoclave and heated up to 130 ^{0}C. Then the oil and the reagents are pumped to the reaction chamber, where the de-chlorination takes place under vacuum. The oil from the reaction

chamber is drained off to control the PCB concentration. Approximately after an hour bentonit is added to the reaction chamber, which is an additive for filtration of the sludge and sodium chloride. The final step is the filtration, when the sludge is separated form the regenerated oil. The technology has recently been relocated to Set Car S.A. in a joint venture.

Set Car S.A. in Braila is the operator for the Eastern demonstration area. Concerning PCBs they remove the PCB-oil from the equipment. High concentration PCBs (>500ppm) are sent to Germany for disposal. Oils with low PCB concentration (<500ppm) are locally processed.

They have several autoclaves where PCB-containing oils are treated in two ways.

The first technology is based on bacteriological decomposition of PCBs.

The second method applies sodium hydroxide-based dechlorination technology.

Both processes are lengthy.

The first one is due to the long reaction time in the biological matrix, the second is due to the less reactivity of sodium hydroxide to metallic sodium. The PCB concentration level is constantly checked and PCB-free oils are finally removed from the autoclaves. They have invested 715,000 US$, mainly in technologies, equipment and laboratory development. With the joint venture with DECOMEDIU S.R.L., they will have direct access to the sodium based dechlorination, which is faster and more established than their own technologies.

The Romanian Government was supposed to provide US$ 200,000 (in-cash and in-kind contribution) through the Ministry of Environment and Forests. These in-kind contribution was planned to be mobilized through ICIM and LEPAs, which include salaries, transportation, communication costs, etc.

During the evaluation exercise the Evaluation Team has requested an up-to-date status of the Government co-financing. The NPC provided the last status report from 2009, which indicated that up to the end of 2008 a total of 69,000 US$ was provided for the project.

The expected contribution from UNIDO was in-kind and included staff salaries for the persons involved and preparation of the technical reports.

The GEF provided 952,000 US$ grant as support to the project. The following table details the expected and actual co-financing inputs.

Co financing (Type/ Source)	**IA own Financing (mill US$)**		**Government (mill US$)**		**Other Sources* (mill US$)**		**Total Financing (mill US$)**	
	Proposed	**Actual**	**Proposed**	**Actual**	**Proposed**	**Actual**	**Proposed**	**Actual**
Grant					0.8	1.573	0.8	1.573
Credits								
Loans								
Equity								
In-kind	0.02	0.02	0.2	0.069			0.22	0.089
Other Non-grant Instruments								
Other Types								
TOTAL	0.02	0.02	0.2	0.069	0.8	1.573	1.02	1.662

*Other refers to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector etc.

4.3.2 Human, technical and administrative inputs

UNIDO, as implementing agency, has provided a backstopping officer at its Headquarters. The International Chief Technical Advisor was nominated to transfer international knowledge and expertise in PCBs management to Romania. He was one of the key persons in transferring knowledge to the local expert teams through training workshops, on the job trainings and daily technical backstopping. He assisted in identification of the required technical infrastructure for the upgrade of the interim storage location.

ICIM, as executing agency undertook technical and management related duties under the leadership of the National Project Coordinator. ICIM also provided sixteen technical experts to the project and established a project office with one secretary. The NPC provided secretarial assistance to the Project Steering Committee as well. ICIM dedicated a laboratory space for the analytical instruments and storage locations for the samples received during the inventory exercise. The electronic PCB database is located within the ICIMs server.

NEPA, REPAs and EPAs have provided access to their PCB database for the ICIM experts. This database has the contact details of the registered PCB-owners, thus was a key input for locating transformers for the inventory exercise. They have also provided human resources to the inventory expert teams during the site visits.

PCB owners provided their authorized personnel to the inventory teams, specifically in approaching the transformers and taking the samples. Operators of the demonstration areas have provided space for the interim storage location; they also allocated the necessary human resources for the implementation of the ESM system. These private industry stakeholders also utilized their PCB disposal technologies for the benefit of the project. Each operator had laboratories that were used and upgraded for the purpose of PCBs analysis.

4.4 Role of the Executing Agency

The Research-Development National Institute for Environmental Protection (ICIM) is a national institute coordinated by the Romanian Ministry of Environment and Forests. It performs - on contracted bases - complex researches and studies in the field of environmental protection and engineering, with accent on the management of waters, air and ecosystems.

The Institute is one of the largest and most vigorous institutions in Romania. It is composed of strong, distinctive and coherent groups of researchers.

ICIM was founded in 1952.

- Number of employees : 320
- High studies employees : 156, of which 30 PhD researchers
- Turnover : 1.5 million USD per year

The institute is located in the Northern part of Bucharest covering a surface area of 8 hectares. Laboratories (chemistry, hydraulics, physics), prototypes constructions and offices are placed in five different buildings.

ICIM undertakes:

- Theoretical Research and Studies
- Applied Research and Studies
- Field Measurement
- Consultancy

- Engineering, designing
- Erection of Small Size Prototypes (water and wastewater treatment plants)
- Manufacture of Hydrological and Meteorological Devices

The main Field of expertise of ICIM include:

- Civil Engineering
- Chemistry
- Energetic
- Biology and Microbiology
- Mathematics
- Physics
- Geology
- Economics

Their activities Centre provides services in the following areas:

- Hydraulic Structures
- Environmental Engineering
- Sanitary engineering (water, wastewater and solid waste treatment and disposal)
- Monitoring of the environment
- Environmental economics and environmental legislation
- Territorial planning
- Urban ecology
- Construction of prototypes
- Training
- Inter-calibration of laboratories in the Environmental Protection Agencies
- Expertise in the Contentious situations

ICIMs integrated monitoring activities on the environment include:

- Environmental Components Integrated Monitoring
- Air quality monitoring
- Water supply technologies
- Water pollution control
- Aquatic ecology and biodiversity
- Fluid mechanics and pollutant dispersion
- Urban engineering and ecology
- Solid waste management
- Constructions environmental impact;
- Constructions and disposal sites stability
- Environmental legislation, economics and statistics
- Industrial pollution

ICIM has implemented many projects, mostly with the assistance of International Organizations. They developed fruitful co-operation with UNIDO, Phare, the World Bank, RAMBOLL -

Denmark; HALCROW - United Kingdom; HASKONING - The Netherlands; EPTISA - Spain; JAICA - Japan; GIB - UK.

ICIM was designated to deliver specific inputs (services, expertise, and procurement of equipment) to the project and produce specific outputs through a series of activities. ICIM was responsible for mentoring the implementation of the activities. It was accountable to UNIDO for the proper use of the funds provided to it and for the quality, timeliness and effectiveness of the services provided and the activities carried out. ICIM was responsible for day-to-day project implementation and the timely and verifiable attainment of the project objectives.

The Executing Agency has established a project office. In consultation with UNIDO it has nominated a National Project Coordinator (NPC) on a full-time base, who reported to the Project Steering Committee (PSC), the Executing Agency and the Implementing Agency.

ICIM through the NPC monitored the adherence to the work plan. His main responsibilities included advising on and monitoring of all technical aspects of the project implementation as well as the financial control over the execution. The NPC worked in close cooperation with the POPs focal point at the Ministry of Environment and Forests and the International Chief Technical Advisor. The NPC was responsible for facilitating UNIDO's project monitoring duties, preparing technical and financial reports to UNIDO and GEF, and confirming the quality of the project's outputs.

Beyond the project monitoring duties, ICIM was also responsible for providing technical assistance to the project stakeholders. They developed in consultation with the CTA, the ESM system for PCBs, they designed the methodology for the inventory exercise, including the inventory forms, labels and the database in which the results of the analysis are compiled.

The Evaluation Team concluded that ICIM had fulfilled its obligations under the project. ICIMs leadership changed several times in the past three years, which to a certain extent has hampered the timeliness of the implementation. Project monitoring was foreseen by quarterly implementation progress reports. Over the course of the project six Steering Committee meeting reports and two implementation progress reports were submitted to UNIDO.

In this regard, the Evaluation Team is of the opinion that there is room for improvement.

4.5 Effectiveness of the project

4.5.1 Benefits delivered

PCB owners have been provided with the assistance that the project initially planned. Trainings were provided for the personnel involved in the management of potentially PCB containing equipment. Oil-containing equipment was sampled, analysed for PCBs and labels were provided to the owners to mark their equipment accordingly. The financial set-up of the project in supporting PCB-owners during the disposal of their PCBs has been changed, as it was indicated in the above chapter. This however has not created conflict of interests.

Operators have been provided with trainings and guidance on how to upgrade their facilities to meet international standards and BAT/BEP requirements. Operators have signed partnership agreements with ICIM. They stated that ICIM has fulfilled the terms of the contract. PRO AIR CLEAN indicated that they had not received one pump.

The procurement procedures took approximately six months, which is normal for international bidding and delivery.

Environmental authorities have received trainings and support by the expert teams of ICIM. This support came at the right time, since NEPA is obliged to monitor the PCB phase-out plans of the

owners of such equipment. The project linked their regular monitoring activities with on-site visits and laboratory back-up.

By putting in place the ESM system in the demonstration areas, the workers engaged in the service and maintenance of potentially PCB-containing equipment are less likely to be exposed to these chemicals. They better understood why strict occupational safety issues are necessary and they have been made aware of the environmental and financial costs of cross-contaminating PCB-free equipment.

The project in this regard has fully delivered the benefits perceived by the stakeholders.

4.5.2 Beneficiaries

The Evaluation Team has concluded that the intended beneficiaries have participated in the project activities, although the project had to alter its focus during the implementation. As was discussed earlier, the largest electrical utility Electrica S.A. has gone through privatization. The new owners were, however, not interested in the project. They claimed several times, even in writing that they did not have any PCBs. The project therefore concentrated on the private industries that are likely to have PCB-containing equipment.

The behavioural pattern of the beneficiaries has significantly changed. There is now a general understanding on the PCB issues, PCB -owners have developed and submitted PCB eliminating plans to the respective authorities. Their employees generally follow the ESM system on PCBs and the required occupational safety measures. NEPA is keeping their PCB database up-to-date. PCB disposal facilities have started their operation in Romania and private sector investment in this regard is improving.

The project has exceeded its disposal target by more than four times. PCB disposal price went down by approximately 80%, form 5.5 US$/kg to 1.2 US$/kg. ICIM has sampled 6,869 transformers and conducted 6,915 analyses. This is 13.5% less than what was expected.

The initial risks and assumptions were valid. The enactment of amended and new legislations took more time than planned. The splitting and privatization of Electrica SA has resulted in the modification of the beneficiaries of the project. The National Environment Fund was not available to subsidise the costs of disposal to the PCB-owners. All these risks have been appropriately addressed by the project management, thus objectives have been fulfilled.

The balance of responsibilities between various stakeholders was appropriate. It was only the National Environment Guard that could have been better involved in the project. They have been inspecting PCB owners, while the project was implemented, though the communication in this regard with ICIM was missing.

The project had to change its financial portfolio, since the National Environment Fund was not ready to co-finance activities. This unexpected change in the implementation had positive benefits on the project, especially on the amount of PCBs that was disposed of and on the likeliness of project sustainability.

The privatisation of Electrica SA had negative impact on the project. Electrica SA had approximately 80% of the electrical equipment in the country. Therefore project activities had to be readjusted to locate 8,000 pieces of equipment for the inventory. In this regard 6,869 pieces of equipment have been tested in 339 enterprises.

4.6 Efficiency of the activities

4.6.1 Primary outputs

Private sector contribution to the project was slightly higher than it was expected at the time of writing the proposal. This is due to mainly two reasons. The first is that increased competition was observed on the local market therefore companies started to make investments in order to be better competitive. Second reason is that large stocks of other POPs, such as HCH an ineffective isomer of lindane, was found in the country, which eventually need to be disposed of. It also boosted the investments in BAT/BEP technologies. In Slobozia a new hazardous waste incinerator is being built especially for disposal of highly chlorinated wastes.

Project primary target was to dispose of 300 tons of PCB-containing equipment. The project however exceeded this target by disposing 1,166 tons. This is 388% increase to the baseline. Concerning the analysis of the inventory samples the project target was 8,000 samples. During the implementation 6,915 samples were analysed, which is 86.4% compared to the planned amount.

The cost of disposal was 5.5 US$ per each kilogram of PCB-waste when project started and 1.2 US$/kg at project closure. This is lower than international average of approximately 4 US$/kg.

Sampling and analysis of the potentially PCB-containing equipment was 31.8 US$/sample against the 27.5 US$/sample initially planned. This is realistic, especially knowing that the samples had to be collected from many small enterprises.

4.6.2 Information dissemination

The project provided on site trainings to 339 enterprises. The number of trained people could not be retrieved during the fact finding mission. Project approach of training of trainers was successful and efficient. The CTA held a two-week theoretical on-the-job training for the Expert Teams. Then the teams on the field trained the PCB-owners, LEPA and REPA personnel, the employees of the interim storage locations, etc. Several meetings were held with the project stakeholders, especially during the development of the ESM system.

4.6.3 Monitoring

Concerning project monitoring activities, there was a day-to-day communication between the Implementing Agency and the National Project Coordinator. The NPC has sent the minutes of six steering committee meetings, one progress and one mission report to the Implementing Agency. UNIDO has undertaken several missions to Romania, especially during project start-up. The CTA has also monitored the progress of the implementation. The NPC has reacted timely on the circumstances when project approach had to be altered, such as instead of subsidizing the PCB-owners, development of local technologies for PCB disposal should be supported, or when newly privatised electrical utilities were not interested in the project, project forces were directed to private industries, etc. These modifications in the course of implementation should have been better communicated to UNIDO as well as the frequency of the progress reports from the NPC to UNIDO should have been submitted quarterly.

The Evaluation Team concluded that project implementation was efficient on the technical matters. In the future more attention should be placed on regular monitoring activities and proper documentation of the project progress.

4.7 Replicability, Training and Public awareness

Over the course of the implementation several activities were addressing transfer of information and knowledge. Several training programmes, workshops and publications were developed and undertaken. Information and awareness programmes were developed by ICIMs expert teams under the guidance of the CTA. The CTA conducted a one-moth training programme involving ICIM staff and experts and representatives from the private sector to serve as resources for future trainings and activities.

One of the main achievements in this regard is the development of a comprehensive environmentally sound management (ESM) system for PCBs. It includes all the necessary tools, guidelines and practices in a written form which are required for successful PCBs management and disposal. The ESM of PCBs was elaborated through the joint work of all involved stakeholders, the Government, public and private entities and NGOs. It was presented, explained and tested in the selected three demonstration areas. The leading principle on which the ESM is built is the protection of human health and environment. It regulates all aspects of the management of in service, out-of-service, phased-out and waste PCB containing equipment with a complete life-cycle management plan, taking full account of the associated environmental and human safety aspects.

The pillars of the ESM system are:

- Principle of safety and prevention
- Polluters pay principle
- Applying BAT and BEP without involving unjustified costs
- Principle of life-cycle management

Adherence to the ESM of PCBs will be obligatory after the environmental authorities will finish its institutionalization through a legally binding document (Government Decision or Ministerial Order). Once approved, the project objectives will be replicated in whole the country.

Inventory activities cover the whole country, therefore expert teams of ICIM have provided on the job trainings to all the eight REPAs in the country and several more EPAs at the local level. They collected samples for the inventories from 339 enterprises, thus at least the same amount of on-site trainings were performed.

The transformer database of ICIM has been made available on the Internet. There is need to link the database at ICIM with the PCB database at the NEPA, since the information is complementary.

Private sector beneficiaries, especially the three operators of the demonstration areas have developed several brochures, informing their potential costumers on their PCB management system, technologies and advertising their services. This expertise has already been utilized since two of the operators won large Government tenders for hexachlorocyclohexan (HCH) elimination and site decontamination.

ICIM has also developed a brochure on the achievements of the project

Over the course of the implementation several workshops were organized to disseminate project related knowledge and expertise. Environment related authorities and the private sector were invited to announce the integration of the project into the activities of the enforcement bodies as a programme.

According to the project document PCB inventory results as well as other technical information, would have to be published in scientific papers. The Evaluation Team however did not find evidence of these publications.

In order to further boost the possibilities for replication of the project, the Evaluation Team recommends ICIM and UNIDO to invite representatives from the surrounding countries to the final workshop.

4.8 Long -term impacts of the Project

The project document has identified six potential long-term impacts as a result of project activities. The analysis, whether these outcomes have been achieved, is provided in the following table.

Planned outcomes of the project	**Implementation achievements**
Capacity to solve the PCB issues at the country level through strengthened institutions and infrastructure	There is a general capacity in Romania to deal with PCBs in an environmentally sound manner. Local technologies for PCB management, waste processing and disposal are available and are working properly. The legislation and institutional capacity is also available. Ministry of Environment and Forests has revised the PCB-related legislation several times. One revision is still pending, which would require PCB-owners to make inventory of their in-use equipment.
PCB- releases into the environment are minimized	Due to the implementation of the ESM system in the selected demonstration areas, PCB containing equipment is handled in an environmentally sound manner. At the interim storage locations and disposal facilities PCBs are managed according to international standards. Once the ESM system is officially approved, these impacts could be observed on the national level. The NEG has undertaken 29 inspections in 2009 and the same amount of inspections are planned for 2010. Strong enforcement will further enhance the release reduction of PCBs into the environment.
Human exposure to PCBs are avoided	Due to the ESM system and the systematic trainings at PCB owners and interim storage locations, PCB

Planned outcomes of the project	Implementation achievements
	related occupational safety measures are strictly followed and are adhered to.
Replicable programme for PCB management for national or international use	The project has proved to be effective and efficient. Public awareness activities were also appropriate. National replication has been observed. International replications can only be achieved if UNIDO, the GEF or the National Authorities provide for the dissemination of the project approach and results. To this end the Evaluation Team advises that representatives of environment authorities from the surrounding countries be invited to the final workshop.
PCB disposal options and facilities are available	The achievement of this outcome has been observed. One hazardous waste incinerator has been upgraded to burn highly chlorinated wastes, several non-combustion technologies have been put in place for the chemical decomposition of PCBs and another incinerator is being built for the disposal of hazardous wastes, especially highly chlorinated wastes. Local pre-processing of the PCB wastes has also been observed.
Well-trained technical personnel is available in PCB management	The project has trained 339 PCB-owners, personnel of 3 interim storage locations, 16 national experts and several other government employees. The Evaluation Team believes that the necessary pool of experts have been created to allow the continuation of project activities.

4.9 Rating of the project performance regarding:

The project document included a logical framework analysis to assess and monitor its performance. The terminal evaluation used the same concept to assess the rating of the performance.

4.9.1 Objectives

The objective of the project was to reduce and eliminate the threats to human health and the environment posed by PCBs in Romania. It also aimed at strengthening the country's national capacities to manage the PCB issues in an environmentally sound manner. It planned to create a financially feasible management system for safe and environmentally sound phase-out and disposal of PCBs and PCB-containing equipment. Further, it tested all the elements of this management system in practice in the demonstration areas.

The project has achieved all the primary objectives. The performance can be rated at 100%.

4.9.2 Outcomes

Foreseen outcomes	Comments
• capacity to solve the PCB issues at the country level through strengthened institutions and infrastructure; • an environmentally sound PCB management system by developing and adopting policies, guidelines and financial instruments for managing and disposal of PCBs; • replicable programme for PCB management for national or international use; • reliable PCB inventory at the demonstration areas, and detailed countrywide PCB inventory estimation; • identified PCB disposal options and facilities; • removal and disposal of PCBs and PCB-containing equipment from the demonstration areas; and • Public awareness and well-trained technical personnel involved in PCB management.	• Private owners of PCB-containing equipment co-operated in the activities. • The National Environment Fund did not support the project • Sufficient local expertise has been created on which capacity buildings and other project activities and could be built. • Three facilities have been identified for PCB interim storage and disposal. PCB disposal price has been drastically decreased. • The project was successful the ESM system for PCBs will be integrated under the Ministry of Environment and Forests or designated as a regular programme.

The project has achieved all of its planned outcomes. The performance can be rated at 100%.

4.9.3 Outputs

The project had five main components:

- Project coordination
- Strengthened institutions and ESM system
- PCB management at the demonstration areas and practical implementation of the ESM system
- Countrywide plan of actions for PCB elimination
- Adherence to the Project Document and public awareness

Each component included several activities and outputs. The analysis concerning the project performance in this sub-chapter is based on the attainment of the outputs. To this end the logical framework provided clear indicators of success. The rating of the performance is provided for each component.

Activity No	Description	Output	Observation
1	**Project Coordination**	**The project steering committee was established. Its working procedures were agreed on, it is operating.** **The Inception workshop was held. Three demonstration areas were identified. The West demonstration area is around Timisoara. The interim storage location was developed at Pro Air Clean S.R.L.** **The Central demonstration area is located around Craiova. Activities are managed by DECOMEDIU S.R.L.** **The third demonstration area is located at the East part of Romania around Braila. The coordination here is undertaken by Set Car S.A.**	**Increased awareness on PCBs and PCB related matters.** **The key components for efficient project management are in place. There is a regular communication between the key stakeholders, whereby and the objectives reached.**
1.1	Setting up of project coordination and refining the work plan	Project Steering committee, work plan, refined budget	Adherence to the work plan is achieved.
1.2	Inception workshop for all stakeholders	Inception workshop was held in Bucharest, eighty people participated.	Awareness was created among government bodies, local authorities and hazardous waste management companies on the objectives of the project and on PCB management.
1.3	Development of alternatives for environmentally sound management of PCB	A resource allocation system was developed to facilitate and speed up the gradual elimination of PCB-containing equipment.	The willingness of PCB-owners are increased to remove their PCB-containing equipment. Despite the global economic crisis the pace of PCB elimination increased. Due to the catalytic role of GEF, the PCB disposal prices went down, currently they are in the range of 1.2 US$/kg. According to Pro Air Clean S.R.L. and Set Car S.A. earlier they charged minimum of 5.5 US$/kg.
1.4	1st Round Table Discussion	Meeting held in Bucharest with the participation of potential operators, steering committee members, representatives from the Ministry of Environment and Forests. The possibility of using the Environment Fund for subsidising the cost of PCB removal was discussed.	Potential partners during the implementation met and agreed on the modalities of working together.
1.5	Discussions for selecting the demonstration areas	Meeting was held in Bucharest; criteria for selecting demonstration areas were agreed.	Based on the preselected criteria the potential demonstration areas could be identified.
1.6	Developing criteria for selecting the demonstration areas and selection of the areas	Three locations have been identified.	It is important to avoid market distortion by supporting the private sector unevenly.
1.7	Development of a MoU with the local government of the selected demonstration areas.	Contracts have been signed with Pro Air Clean S.R.L., DECOMEDIU S.R.L. and Set Car S.A. Each company was provided with equipment for 70.000 USD.	Companies have proper equipments for management of PCBs specifically for local separation of PCBs from the metal parts in order to reduce the weight shipped for final disposal.

Activity No	Description	Output	Observation
1.8	Meeting for signing the MoU	MoUs are signed	Companies are complying with the MoU.
2	**Institutional strengthening and capacity building**	**16 people at ICIM received intensive on-the-job training, laboratory equipments were provided to ICIM and the three selected operators,** **Government officials were informed on the PCB-related obligations of the Stockholm Convention and the development of the ESM guidelines.**	**ICIM has the necessary capacity to assist the Government and the private sector in PCB management. They also have the necessary capacity to extend their services in undertaking research and development in the field of PCBs.** **PCB related legislations are updated, but further improvement is needed.**
2.1	Setting up task teams and training of the task teams	Three task teams were formed, with approximately ten experts mostly from ICIM. International expert provided training on how PCB management guidelines should be developed.	Capacity was created for developing the required guidelines.
2.2	Developing procedures for identification of PCB-containing equipment and reporting	LEPAs provided access to their database for the expert teams. The list of PCB-owners was retrieved.	ICIM had contact details to the PCB-owners. Due to the lack of interest form the electrical sector stakeholders; the project collected the inventory samples from the medium and large scale industries.
2.3	Developing procedures for labelling the electrical equipment	Labelling instructions have been developed, The labels were provided by ICIM after the analysis of the oil samples was completed.	Inventory and labelling capacity was created. The durability of the labels is questionable especially the information that is written on them at ICIM.
2.4	Preparation of guidelines for good practice for maintenance	The good practice for maintenance was developed as part of the ESM of PCBs document.	ESM documentation was made available to the owners of PCBs. It also laid the foundation for a unified system for the management of PCB-containing equipment and wastes. The ESM system awaits its approval by the Ministry of Environment and Forests
2.5	Developing safety measures to avoid PCB releases to the environment from working equipment	The safety measures to avoid PCB releases from working equipment were developed as part of the ESM of PCBs document.	The procedures have been developed in consultation with the CTA and experts from the electrical sector.
2.6	Developing procedures for collecting PCB-containing equipment, and format of reporting	The collection procedures for PCB-containing equipment were also developed as part of the ESM of PCBs document.	The procedures have been developed in consultation with the CTA and experts from the interim storage locations.
2.7	Developing financial mechanisms for minor users of PCB to withdraw contaminated equipment	Discussion has started with the Ministry of Environment and Forests to open the possibility of using certain resources at the Environment Fund for subsidising PCB disposal operations. Especially in cases where the ownership of the equipments are unclear.	The discussion has started, but agreement could not be reached. The project facilitated investment in the field of PCB disposal. This reduced the price of disposal.
2.8	Developing financial mechanisms for major users of PCB to withdraw contaminated equipment	The price reduction in PCB disposal has positively affected the largest PCB owners. They seemed to be	Gradual elimination of PCB containing equipment is secured and observed.

Activity No	Description	Output	Observation
		capable of comply with the legal requirements without additional incentives.	
2.9	2nd Round Table Discussion	This activity has not been undertaken, as the National Environment Fund was not available for subsidising PCB disposal operations.	The use of the National Environment Fund for the disposal of the PCB-containing equipment, which is located at enterprises that had gone bankrupt, is advisable.
2.10	Amending the legislation	The legislation was amended, specifically Govt. decisions 291/07.04.2005, 210/28.02.2007 and 975/22.08.2007. A governmental decision was made to update the National Implementation Plan - Govt. decision no. 1497 of 19 November 2008	The inventory of PCB-wastes is required by the legislation. It is contradictory to the SC, which also requires the inventory of in-use equipment as well. The law says that PCB-containing equipment can be used until their end of lifetime. This is contrary to the SC, which sets 2025 as the final deadline for using PCB-containing equipment.
3	**PCB management at the demonstration area**	**Demonstration areas are identified. ESM has been implemented at the selected facilities.**	**Gradual elimination of PCB-containing equipment, increased investment into the field of hazardous waste disposal.** **Competition on the PCB disposal field is increased, disposal prices have decreased.**
3.1	***Detailed PCB inventory***	***Three strengthened laboratories,*** ***6869 transformers were sampled. Electronic database for PCB reporting.***	***Laboratories are available for PCB analysis and labelling. Project target of 8000 samples could not be reached.***
3.1.1	Meeting with the stakeholders of the selected demonstration areas	The meetings were held at each demonstration area, where the main stakeholders were present. These meetings were also used to train the stakeholders on inventory of PCB-containing equipment.	Practical experience was created at the demonstration areas for identification of PCB-containing equipment.
3.1.2	Training on PCB equipment identification and PCB waste handling	Four expert teams visited 36 counties. 339 enterprises were provided with training on PCBs and related management practices.	The number of trained people could not be obtained as no records were kept concerning the on-site trainings.
3.1.3	Identification and upgrade of laboratories for testing oil samples	The project has set up a laboratory at ICIM dedicated for oil analysis for PCBs. Four L2000DX equipment were procured and are used for analysing the oil samples for the inventory exercise. At Pro Air Clean S.R.L. a GC has been installed for the analysis of organic materials including PCBs. Set Car S.A. has also invested in upgrading their laboratory.	Capacity is available for PCB analysis.
3.1.4	Identification of PCB-containing electrical equipment	6,915 samples were taken and analysed from 6,869 pieces of equipment. The inventory found 740 pieces of equipment with PCBs above 50ppm; 647 is in operation, 93 is withdrawn from service. 163 transformers were found to contain PCBs above 500ppm and 577	Experience was gained in inventory of PCB-containing equipment. A PCB database has been developed and is working. Ministry of Environment and Forests is advised to

Activity No	Description	Output	Observation
		transformers contain PCBs between 50ppm and 500ppm	maintain this inventory database and use it for its reporting obligations under the SC.
3.1.5	Labelling all tested electrical equipment	6,869 pieces of equipment were labelled.	Owners of oil-containing electrical equipment are more conscious on PCBs and their obligations for PCB elimination.
3.1.6	Development of a focused inventory of PCB-containing equipment and wastes	An electronic database has been established. All the inventory data has been entered into the database. The inventory reports are available on the internet on ICIMs servers.	The preliminary inventory of the NIP has been refined and more accurate data is available for reporting and making decisions.
3.2.	***Interim storage for PCB-containing equipment and wastes***	***Three facilities have been upgraded, ESM has been implemented, and trainings have been completed.*** ***1,166 tones of PCB-containing wastes have been collected.***	***Interim storages are fully operational, occupational safety measures are at international level, awareness on PCBs at the demonstration areas are improved.***
3.2.1	Identifying interim storage locations for PCB-containing equipment and wastes	Potential interim storage locations in the selected demonstration areas were visited and evaluated.	A pool of candidate companies for interim storage of PCB-containing equipment.
3.2.2	Selecting interim storages within the demonstration areas	Three interim storage locations were selected. One in each demonstration area. Contracts were signed with all the operators of the interim storage locations.	The terms of the cooperation between the project and the interim storages were agreed. This created a clear understanding on the responsibilities and rights of each partner.
3.2.3	Developing plans for upgrading the interim storages to meet international standards	Each operator of the interim storage locations received equipment and tools worth of US$ 70,000, as well as written instructions on how the storages should be designed, operated and maintained. All agreed items were received by the operators except one pump for Pro Air Clean.	All of the interim locations were visited. They work according to international standards. PCB releases into the environment are avoided; occupational safety measures are strictly followed.
3.2.4	Developing and introducing environmental monitoring system at the interim storages	A copy of the ESM guidelines for PCBs was provided to the operators. At each location an on-site laboratory was established for PCB analysis. They follow the required ESM procedures.	The field visit and the inspections of the authorities did not find non-compliance to the ESM system and the current legislations. PCB releases to the environment are eliminated.
3.2.5	Phase-out, collection and storage of PCB equipment in the demonstration areas	Pro Air Clean S.R.L. has collected 770 tones of PCB containing equipment. Deco Mediu srl has collected 80 tones of PCB-containing equipment. Set Car S.A. has collected 850 tones of PCB-containing equipment. Altogether 1,166 tons of PCB-containing equipment has been collected.	The gradual elimination of the PCB-containing equipment has been achieved.
4	***Countrywide plan of actions for PCB elimination***	***PCB phase-out plan for each PCB owner is in place***	***It is obligatory to submit the PCB-phase-out plan to the LEPAs. LEPA monitors the implementation of these plans, and regularly updates their PCB database.***
4.1	Countrywide detailed inventory estimation	PCB database for the whole country	The two databases are

Activity No	Description	Output	Observation
		for the phased-out equipment is in place at the NEPA. Transformer database for the country is available in ICIM. This database includes transformers and is based on analysis.	complementing one another. The database at ICIM contains necessary information for the reporting obligations of Romania under the SC. It is advisable to maintain both databases and continue the inventory on in-use equipment.
4.2	Countrywide phase-out and elimination options	Romania has developed appropriate capacity to manage PCBs in the country in an environmentally sound manner. Most feasible disposal option identified. PCB phase-out plans of each PCB-owner are developed and filed at the LEPA.	The phase-out plans do not cover in-use equipment. Further improvement is needed in this regard.
5	**Adherence to the Project document**	**Generally the project document was followed during the implementation. The project activities exceeded the initially planned two years. Due to changes in the implementation environment, project has undertaken changes.**	**The primary objectives of the project have been reached. Technical part of the implementation was appropriate, changes in the implementation occured and the project benefited from these changes.. A more controlled and monitoring performance are however needed.**
5.1	Regular monitoring and evaluation	Regular project monitoring and reporting has not been fully complying with the project document.	The NPC has submitted six PSC meeting reports, one progress report and one mission report. A better follow-up is needed in this regard from the Implementing Agency.
5.2	Project closure	is still pending	Representatives of Environmental Authorities from the neighbouring countries having similar problems with PCBs, could be invited to the close-out workshop to assure project replicability at a regional level.

As the result of the above the project performance of each component may be rated as follows:

Component No.	Title	Rate of performance
1	**Project Coordination**	95%
2	**Institutional strengthening and capacity building**	100%
3	**PCB management at the demonstration area**	100%
4	**Countrywide plan of actions for PCB elimination**	95%
5	**Adherence to the Project document**	65%

Overall rate of project performance regarding the achievement of the outputs is at 91%.

4.10 Contribution of the project to GEF focal area strategic targets

The GEF-4 focal area strategies document of 2007 May was used instead to assess the contribution of the project towards the GEF strategic targets.

The project is addressing two strategic priorities of the POPs focal area of the GEF. Under **Strengthening Capacities for NIP Development and Implementation** the project has strengthened the legislative and regulatory framework for the management of PCBs. New pieces of legislations have been developed and enacted which clarified the obligations for PCB management, reporting, phase-out and disposal. The Governmental decision 173/13.13.2000 on regulating the special management and control of PCBs and similar compounds was revised three times by 291/07.04.2005, 210/28.02.2007 and 975/22.08.2007 decisions to harmonize PCBs related legislations with international standards. A governmental decision was made to update the National Implementation Plan - Government decision no. 1497 of 19 November 2008. The ESM system has been developed and is waiting for the approval by the Ministry of Environment and Forests.

Further, on the administrative capacity at the national, regional and local level authorities of the demonstration locations have been strengthened. NEG included among their regular activities the inspection of potentially PCB-containing equipment and the management practices and phase-out plans of the PCB owners to reduce the PCB-related human health and environmental risks. This has lead to strengthened and sustainable capacity for enforcement of the PCB-related legislations in the demonstration areas and in the whole country.

The Partnering in Investments for NIP Implementation priority of the GEF has been addressed by the environmentally safe phase out and disposal of 1,166 tons of PCB-containing equipment. Due to the investment of 1,573,000 US$ by the private sector in BAT/BEP in this field the average cost of PCB disposal has decreased to 1.2 US$/kg. This figure includes local processing and disposal costs.

High strength PCB wastes such as PCB capacitors have been locally dismantled, carcasses have been washed with perchlorethilene. Cleaned metal parts have been sold as scrap, pure PCBs have been sent for incineration abroad. PCB-contaminated transformer oils have been disposed of different ways. One alternative was local incineration. There is one facility in Romania, which can incinerate low strength chlorinated wastes. At this location low level PCB-contaminated transformer oils were incinerated. During the implementation of the project activities this facility has upgraded its technology with oxygen injection, therefore it can now incinerate pure PCBs as well.

The same enterprise has also invested in establishing in Slobozia the first incinerator in Romania dedicated for highly chlorinated wastes. The plant will be fully operational in 2011.

At another demonstration area a metallic sodium-based dechlorination technology was installed and used for dechlorination of the transformer oils. The only draw-back of the technology is that the cleaned oil stream of the process can not be directly re-used as transformer oil. Further investments are needed to upgrade such oils, which was not available at the participating enterprise. Therefore the costs of the dechlorination could not be competitive to incineration.

At the third demonstration area a sodium hydroxide-based dechlorination technology was developed and utilized. The process is lengthy due to the less reactivity of sodium hydroxide to metallic sodium. The disposal costs may be rated at the same level of the ones for incineration.

The conclusion of the assessment of these alternative approaches to incineration is that they are in the same cost window as incineration, unless the side-stream product, the cleaned oil could be sold for any use. Once it is resolved this problem, by further investments and market research,

the non-combustion technologies will be more cost-efficient than incineration in the case of low PCB-contaminated oils. This could then further reduce the disposal cost of PCBs and other POPs.

In all cases the metal parts were cleaned and sold as scrap. Wooden and paper parts have been incinerated.

4.10.1 Global environmental benefits

The project has contributed to global environmental objectives, through developing and introducing the ESM system for PCBs. The environmental releases and human exposures by PCB have been significantly reduced. By removing those equipments and wastes, which were in the most critical condition, the risk of PCB releases to the global atmosphere, soil, and water bodies were eliminated. The project has removed and disposed of 1,166 tons of PCB-containing wastes. The project has facilitated the goals of two global treaties, the Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Wastes and the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal.

4.11 Possibilities of sustainability

Project sustainability has four pillars: legal, technical, financial and institutional.

4.11.1 Legal

The project has developed an environmentally sound management system for PCBs. This system is a guideline which is waiting for signing by the respective environmental authority. Once approved, it will become a legal binding document in Romania, therefore PCB-owners will be required to follow its principles. The National Environment Guard is undertaking inspections to assure adherence to the environment related legislations. The National Environment Protection Agency is also monitoring compliance to the reporting and PCB phase-out obligations of the PCB-owners.

4.11.2 Technical

New technologies have been transferred to create the necessary technical capacity for the management of PCBs and PCB wastes. Three non-combustion technologies and upgrade in an incineration facility have been introduced. This created diversity in disposal options.

4.11.3 Financial

Due to the investments of the private sector in establishing BAT/BEP technologies for the disposal of PCBs, these waste streams can now be treated in the country in an environmentally sound manner. The investments in this sector are continuing which further increase of the Romania disposal capacity. Consequently the disposal price of PCBs has dropped from 5.5 US$ to 1.2 US$ per kilogram of waste. This price is very competitive, thus PCB owners are interested in undertaking the elimination.

4.11.4 Institutional

Expert teams of the project have provided extensive trainings at different levels of the Environment management sector. There are enough resource persons with appropriate knowledge in the country to continue the project activities and assure that project objectives, such as environmental consciousness, are followed.

4.12 Indicators of success

The analysis of success based on the indicators for each project component, which were established in the project document, is included in the following table.

Target Indicators of the project document	Means of verification (monitoring mechanisms)
Project Coordination	
• Project management unit established at ICIM; • Project team selected and contracted; • Project Steering Committee (PSC) established and functioning; • Detailed work plan with clear description of activities developed and agreed upon by all stakeholders; • Communication strategy prepared and implemented on three levels: with all stakeholders, with project team and with implementing agencies; • ESM concepts based on round table discussions; • MoU with the local governments of the demonstration areas; • Funds mobilization plan prepared.	• UNIDO, ICIM contract 31st November 2007; • List of PSC members; • Minutes of meetings of the project steering committee (minutes of six meetings are available and were sent to UNIDO); • Report of the inception workshop; • MoUs with the local governments of the demonstration areas (three areas) could not be retrieved, but the system is in place; • Fund mobilization plan was not developed since the National Environment Fund had not available funds for supporting the activities.
Strengthened institutions, ESM system	
• Capacity building programmes designed for ESM development; • Capacity building programmes conducted; • ESM system is developed and approved; • Sustainable financial mechanism for all concerned parties are agreed and approved.	• Employees of 339 companies are trained, no. of people was not recorded; • The publishing of the ESM system is pending; • Employees of 339 PCB owners, 3 operators, at least 4 LEPAs and 3 REPAs and central authorities were involved in the capacity building activities; • Investment promotion for PCB operators have been achieved.

Target Indicators of the project document	Means of verification (monitoring mechanisms)
PCB management at the demonstration areas and practical implementation of the ESM system	
• Five to eight ask teams are nominated and trained per demonstration area • One laboratory is selected in each demonstration area • 8000 samples tested (80% from Electrica SA, 20% from private owners) • All tested equipment are labelled • One interim storage site is selected, and upgraded in each demonstration area • 300 tons of PCB-containing equipment is disposed of.	• Six Expert Teams were trained, mainly ICIM employees; • Three laboratories were strengthened; • 6,915 samples were taken and analysed from 6,869 pieces of equipment; • Expert evaluation of the upgraded interim storage areas confirmed their compliance to international standards; • Quarterly disposal reports were not submitted. 1,166 tons of PCB containing equipment were disposed of.
Countrywide plan of actions for PCB elimination	
• Countrywide PCB inventory estimate • Plan for Countrywide inventory taking • Most feasible disposal option identified,	• PCB Inventory Report is available on the internet at NEPA website; ICIM has also placed its database on the Internet. • PCB elimination plans are filed at the LEPAs. • Four technologies are available for PCB disposal in the country
Adherence to the Project document	
• Monitoring and evaluation policy prepared and agreed upon; • Monitoring mechanisms are in place as per the M&E policy. • Private sectors financial contributions to the activities reach additional 1.5 US$ to 1 GEF US$.	• Quarterly Financial Reports including monitoring of co-financing activities were supposed to be filed. Two progress reports only were found on file. • Co-financing ratio is 1.64 US$ to 1 GEF US$.

One important indicator was not included in the project document; that is the unit cost of disposal. This price has decreased from 5.5 to 1.2 US$ per each kg of waste.

5 CONCLUSIONS AND RESPECTIVE RECOMMENDATIONS ON GENERAL OUTCOMES AND SPECIFIC OUTPUTS

Based on the observation and the analysis on the achievements of the project the Evaluation Team came up with the following 17 conclusions and 13 recommendations concerning:

- Concept and Design of the project
- Implementation of the activities
- Relevance and Strategy
- Monitoring and Reporting
- Awareness rising and training
- Technology Transfer and Financing
- Sustainability

CONCERNING THE GENERAL OUTCOMES ABOUT EFFECTS, related to the target groups/beneficiaries assisted, and pointing out the positive changes obtained in their performance and behavior.			
No	**Conclusions**	**No**	**Recommendations**
1	The general capacity has been established for the environmentally sound management of PCBs through the adoption of international standards and practices. Technical awareness on ESM concerning PCBs has been created countrywide among the national technical parties.	**1**	**<u>For Ministry of Environment and Forests, UNIDO and the GEF:</u>** Ministry of Environment and Forests shall approve and publish the ESM system. National Environment Guard should regularly assure the enforcement of the ESM system. UNIDO and the GEF should disseminate the results of the project in other countries for possible replication.
2	The Medium Sized Project Proposal for this project for requesting GEF funding was endorsed on behalf of the Romanian Government on 11 January 2006, by Mr. Silviu Stoica, General Director, GEF Focal Point at the Ministry of Environment and Forests and approved by the Chief Executive Officer of GEF on 15th August 2006. Following the usual routine administrative procedures for establishing an international project at national level, the activities started officially at the in June 2007. The cooperation agreement between UNIDO and ICIM as the executing agency is dated 31st November 2007. The project has therefore bypassed the foreseen duration of two years, without exceeding the forecast budget.		

CONCERNING THE GENERAL OUTCOMES ABOUT EFFECTS, related to the target groups/beneficiaries assisted, and pointing out the positive changes obtained in their performance and behavior.			
No	**Conclusions**	**No**	**Recommendations**
3	The disposal price of PCBs and PCB wastes has decreased by 80% due to the technology transfer, the investment promotion and the capacity building activities of the project. These results assure the sustainability of the project.		
4	Replication of the project is an evident consequence of the results achieved. The project involved the National Environment Protection Agency, the Regional and Local Environment Protection Agencies at the selected demonstration areas. Through the support of NEPA, the project activities performed at the demonstration areas have been extended to the whole country. Due to the strict deadline of final PCB elimination and to the achieved reduction of the PCB disposal price, the increase in the pace of disposal was observed not only in the demonstration areas but also in the whole country. This has been the best demonstration for the improvement of the global environment and proved the existence of national capacity to continue the activities.	**2**	**For Ministry of Environment and Forests and NEPA:** It is imperative that Ministry of Environment and Forests and NEPA continues the monitoring of the PCB inventory and disposal activities. The Stockholm Convention requires regular national reporting on PCB inventory.
5	NEPA has an inventory database only on phased-out and waste PCB containing equipment. It is based on self reporting by the PCB owners, who need to file phase out plans as well. NEPAs countrywide PCBs inventory is regularly updated by the Local Environment Protection Agencies. The project has developed inventory database for transformers, which is kept in ICIM. This database is based on chemical analysis, whereas the database held at the NEPA is based only on self reporting. The database at ICIM is complementary to the NEPA database and it contains information on in-use equipments as well.	**3**	**For NEPA and ICIM:** NEPA and ICIM shall regularly inform the POPs focal point in the Ministry of Environment and Forests on the PCB inventory and phase-out activities so that the concerned authorities could be informed and kept updated.

CONCERNING THE GENERAL OUTCOMES ABOUT EFFECTS, related to the target groups/beneficiaries assisted, and pointing out the positive changes obtained in their performance and behavior.			
No	**Conclusions**	**No**	**Recommendations**
6	Since the project has put in place best available technologies for disposal of PCBs and PCBs containing equipment, the targets established in the project have been exceeded by eliminating 1,166 tons of PCB containing equipment against the planned 300 tons. Further, 6915 oil samples have been taken and analysed during the implementation against the 8000 targeted. The sole electricity provider in the country Electrica S. A., from which 80% of the samples should have been collected, had been split and privatised just before the start of the project. The inventory team of ICIM did not have authority to enter the premises of the new owners that were not cooperative and reluctant to participate questioning the validity of the analysis and claiming that they had already their system in place and further that they do not have a legal obligation for allowing the team to collect samples. The disposal and inventory targets of the project were established on the basis of the preliminary inventory of the National Implementation Plan (NIP). According to the information received the National Environmental Guard has completed 29 inspections at the premises of private operators in 2009. These operations are foreseen to continue regarding PCB wastes.	**4**	**For private Enterprises, Ministry of Environment and Forests, National Environment Guard, UNIDO and GEF:** Enterprises dealing with hazardous wastes management should continue to invest in adopting BAT/BEP. The Government should continue to support promoting private sector investments into this field. State-of-the-art technologies can further reduce the costs of disposal of not only PCBs, but also of other POPs such as hexachlorocyclohexanes (HCH). UNIDO and GEF should continue supporting projects in the area of POPs, particularly considering that new chemicals have been added to the list of the Stockholm Convention. The National Environment Guard should continue PCB-related inspections in their regular activities and shall accompany the the inventory teams to PCB owners, as already requested by the National Project Coordinator in a letter to the Guard dated 23rd June 2009.

5.1 Specific Conclusions and Recommendations concerning the single Outputs foreseen by the project:

Output 1: Project coordination			
No	**Conclusion**	**No**	**Recommendation**
7	The project management structure has been established, is in place and is working properly. The project is a good example of cooperation between state and private sector to achieve global environmental benefits.	**5**	**For Ministry of Environment and Forests and ICIM:** The capacity the project created within ICIM in the field of PCB management should be maintained and possibly utilized for other POPs related activities such as inventory and disposal of HCH wastes and contaminated soils.

Output 2: ESM system for PCBs and institutional strengthening			
No	**Conclusions**	**No**	**Recommendations**
8	The ESM system developed by the project is, however, still waiting the final approval by the National Authorities concerned with this responsibility. The project has strengthened three laboratories (Pro Air CleanS.R.L., Set Car S. A. and one at ICIM) for the analysis of PCB samples collected by the project. The project has approached 339 companies providing awareness and training on PCBs. These enterprises have participated in the inventory exercise covering all the country.	**6**	**For Ministry of Environment and Forests and ICIM:** The ESM system for PCBs needs to be approved and published. The laboratory capacity, created by the project, should be maintained and utilized for the inventories of newly added POPs under the Stockholm Convention. The activities for replication of the achievements of the project should continue. Direct assistance to individual enterprises should be strictly limited to those taking part in a pilot scheme for demonstration purpose, to avoid the risk of market distortions.
9	The project had more than expected positive results on the concerned parties.	**7**	**For UNIDO: and GEF** The Evaluation Team recommends that these positive achievements are brought to the attentional on the official channels to the Romanian authorities to further disseminate the awareness and promote the possibility of further cooperation under the GEF portfolio. Higher political and technical level personnel of the Ministries involved in the activities of the project should be invited for the final technical workshop concerning the closure of the project..

Output 2: ESM system for PCBs and institutional strengthening			
No	**Conclusions**	**No**	**Recommendations**
10	The financial mechanism foreseen by the Government to subsidize PCBs awareness raising concerning PCBs disposal and elimination is not yet in place and approved by the National Central Authorities. Therefore the project has selected an alternative approach to subsidize PCB disposal (local pre-processing of the waste, local PCB disposal technologies versus export treatment).	**8**	**For Ministry of Environment and Forests:** Consider the possibility to utilize the National Environmental Fund for this purpose in order to subsidize some of the disposal costs.

Output 3: PCB management at the selected demonstration areas and implementation of the ESM system			
No	**Conclusions**	**No**	**Recommendations**
11	The unit cost of PCB disposal has decreased from around 5.5 US$ per kg at the beginning of the project activities to around 1.2 US$ per kg at the time of the evaluation.		
12	The measures to avoid the PCB releases into the environment due to the adherence to the ESM system have proven to be a big achievement to protect the environment. Occupational safety measures for the people involved and exposed to the hazards of this exercise are well established and according to the international legislations and standards.	**9**	**For the National Environment Guard:** Adherence to the ESM should be assured by regular and periodical inspections at the PCB locations by the National Environment Guard.
Output 4: Countrywide plan of actions for PCB elimination			
No	**Conclusions**	**No**	**Recommendations**
13	PCB elimination plans for each PCB waste owner have been developed. NEPA is keeping track of these plans and their implementation. National legislation sets 31 December 2010 as the deadline for the elimination of all PCB-containing wastes. Utilization of operational equipment containing PCBs is allowed until the end of its life cycle, which is contradictory to Annex A Part II of the Stockholm Convention. The project has demonstrated the effectiveness of the ESM system in three selected demonstration areas.	**10**	**For NEPA, Ministry of Environment and Forests and ICIM:** NEPA should continue the monitoring of the implementation of the phase-out plans. The cooperation between NEPA and ICIM concerning the analysis of the oil samples for PCBs should be maintained utilizing the laboratory of ICIM. Ministry of Environment and Forests shall amend Govt. decision 975/22.08.2007 requiring self-reporting of PCB inventory and phase-out plans for in-service equipment as well.

Output 3: PCB management at the selected demonstration areas and implementation of the ESM system

No	Conclusions	No	Recommendations
14	The inventory has identified PCB-containing equipment for which the responsible owners are no longer commercially active (bankrupt). The disposal of these equipment has not yet been solved.	11	**For Ministry of Environment and Forests:** The National Environmental Fund could be used as a possible financial resource in this regard.
15	The diversity of the locally available disposal technologies for the PCB elimination in the country has been developed thanks to the project. The project has established three interim storage locations and provided equipment for their operation. Applying local pre-processing of the PCB-wastes and disposing them in the country versus the option of their shipment (after careful local packaging according to the international requirements) for disposal abroad has reduced the price and accelerated the disposal.	12	**For private Enterprises, Ministry of Environment and Forests, UNIDO and GEF:** Same as recommendation No 4. at general outcome level. Enterprises dealing with hazardous wastes management should continue to invest in adopting BAT/BEP. The Government should continue to support promoting private sector investments into this field. State-of-the-art technologies can further reduce the costs of disposal of not only PCBs, but also of other POPs such as hexachlorocyclohexanes. UNIDO and GEF should continue supporting projects in the area of POPs, particularly considering that new chemicals have been added to the list of the Stockholm Convention.

Output 5: Adherence to project document

No	Conclusions	No	Recommendations
16	The NPC has periodically contacted UNIDO regarding the request for equipment and other project related matters, sending also the minutes of six Steering Committee meetings held by the project on July 2007, November 2007, February 2008, May 2008,. March 2009 and April 2010. The positive results achieved by the project in the selected demonstration areas, which represent around 20 % of the national territory, have been spread all over the country, assuring in this way the effectiveness of the action undertaken by the project for the minimization of PCB releases in the environment.	13	**For the Project management:** The NPC should have sent reports to UNIDO on a quarterly basis as specifically stated in the project document. Unfortunately this procedure has not always been strictly followed. In case of continuation of the project this procedure should be taken into account. In the future for similar projects this procedure should be carefully monitored. The degree of achievement of the objectives should be indicated for each output. The training and upgrading of skills and capacities should not stop at the end of the

Output 5: Adherence to project document			
No	**Conclusions**	**No**	**Recommendations**
			training course or seminar, but be reinforced periodically through refreshing courses and continuous professional advice. The regular and continuous training of personnel involved in sound environmental management, at all working levels, should be a standard educational element for all the environment related projects. The exchange of information regarding the analysis, results and methodologies applied has to be disseminated to assure the general application of the best environmental practices.
17	Regarding co-financing cash contribution to the project by the private sectors involved in the activities has reached approximately 1,573,000 US$ for investment in BAT/BEP. In-kind contribution from the Government was approximately 69,000 US$ according to a report from September 2009 covering the fiscal years of 2007 and 2008 (apparently the data for 2009 and 2010 are missing in this regard). The total co-financing of the project can be calculated in 1,642,000 US$ that is slightly above the desired 1:1.5 ratio for co-financing the received GEF contribution.		

6 LESSONS LEARNED

(Lessons learned are generalizations, positive or negative, based on evaluation experiences with projects. The lessons derived can abstract from specific circumstances to broader situations.

Frequently the lessons highlight strengths or weaknesses in formulation, design and implementation that can affect performance and results. Therefore, the lessons can be retained for improving quality and effectiveness of the assistance in future projects.

However, it has to be considered that the lessons learned in the evaluation of a project are not always applicable to other countries or projects, which can have a different situation under the political or industrial point of view.)

The following lessons have been derived from this evaluation:

1) Technology is a combination of several actions, like joint ventures, licensing, purchase of machinery, consultancy and training, maintenance contracts and even new technological processes originated and developed in the enterprises themselves.

   Implementation or adaptation of technological changes normally involves investments and consequently it originates the problem of financing for the interested enterprises.

   In the case of this project it has been demonstrated that technology development reduces the prices for the proper disposal of the waste and that this approach is more sustainable than subsidizing the disposal costs of the wastes.

2) The upgrading of local disposal capacity for waste is helping in resolving the national disposal problem. Further, improving the available national technological capabilities it is a considerable help for the country for not depending on the changes of the global markets.

3) Proper and regular monitoring of the project gives the opportunity to adjust timely the production of the outputs according to the initial planning.

4) Following the evaluation exercise, the national stakeholders and the members of the Steering Committee should be informed and invited well in advance and in writing by the management of the project to the final presentation of the conclusions and recommendations by the Evaluation Team.

5) During the formulation of a project particular attention should be paid to the quantitative figures of the outputs to be accomplished, in order to avoid that later, when evaluating the results achieved by the project, these are much more than expected in relation to the target indicators expressed in the project document. In some cases this may indicate that the forecast was too optimistic or too pessimistic.

6) The compilation, analysis and dissemination of the experiences of a positive and successful project require that actions are started to promote the replication of the results in other regions or countries. The positive results obtained may create the opportunity for developing mechanisms at national level to encourage and promote the utilization of co-financed resources.

ANNEX I

TERMS OF REFERENCE

Final Independent In –depth evaluation GF/ROM/07/001

1. THE PROJECT

1.1. Key data

*Executing Agency:***:**UNIDO, GEF Agency

*Project title:*Capacity Building for Environmentally Sound management ofPCB (Polychlorinated Biphenyl)

National Executing Agency: National Research Development Institute for Environmental Protection (ICIM)

Project document signed: 11 January 2006 (Endorsement on behalf of Romanian Government)

Duration foreseen: 2 years

Budget: US$ 2,020,000 Total financing, divided as follows:

- GEF: 1,000.000.
- Romanian Government and Romanian Partners**:** US$ 200,000 and US$ 800.000 **(**in-kind contribution, including office space, local staff, and some other local expenditure)
- UNIDO (in kind) US$ 20,000

GEF Focal area: Persistent Organic Pollutants

Estimated Starting Date: April 2006

1.2. Brief description of the project

Background:

The National Implementation Plan (NIP) for the Stockholm Convention for Romania identified the PCB issues as one of the top priorities requiring immediate attention and action. Confidence in UNIDO's assistance in the development of the NIP and its action plans provided the rationale to continue the PCB-related activities with a Medium Sized Project (MSP).

GEF funding through the proposed project will consolidate ongoing and baseline activities of the government in implementing its obligations for PCB elimination. The funding will demonstrate implementation of locally viable and environmentally sound PCB control measures and their incorporation into national policy framework. Ultimately, this will facilitate sustainable reduction of PCBs in Romania through subsequent scaling up demonstration, so that more efficient and cost-effective approach for PCB destruction will be available for PCB owners.

The country needs the necessary infrastructure to manage PCBs and PCB containing equipment in an environmentally sound manner. There are no specialized PCB treatment disposal facilities. In this regard, there is a well-recognized need to increase awareness and to train government officials and specialists from industries on the criteria for environmentally sound management, including final disposal, of POPs as waste in the context of the Stockholm and Basel Conventions. The country has little experience on the

practical management of PCBs. Although several international and local companies made disposal of a limited volumes of PCB containing equipment, there has been no government-driven national or local management plans implemented.

Objectives:

The objective of the project is to overcome the current barriers, which impede upon the implementation of the PCB-related obligations of the Stockholm Convention in Romania. The MSP foresees the strengthening of an environmentally sound management (ESM) system of PCBs based on a consensus between relevant government authorities, the private and public sectors and NGOs. The project will create a sound environment for all PCB-related activities. The aim is that all activities should be undertaken in controlled, coordinated manner by protecting human health and the environments form the harmful effects of PCBs. The GEF resources will also be used to establish the necessary environment for implementation of the ESM and to develop a sustainable mechanism to complete the PCBs disposal in Romania. Global significance is that the lessons learned in the project can be multiplied in countries having similar barriers in meeting the obligations of the Stockholm Convention.

Outcomes:

Main outcome of the project will be the increased national capacity to manage PCBs in an efficient and environmentally sound manner, including human capacity, improved regulations, financing options, physical facilities for management of PCB. It will be achieved through development of a national-wide Environmentally Sound Management (ESM) system, which mobilizes all concerned parties to participate in implementing the PCB related obligations of the Stockholm Convention and facilitates their participation by improving the regulation, increasing the awareness, establishing a financial mechanism for phasing out and disposal of PCB and PCB wastes, demonstrating the system at selected regions, training local specialists in different aspects of PCB management.

The ESM system will include a) the relevant regulation updated according to the obligation of the Stockholm Convention, European Union directives, and other international environment-related instruments/agreements, b) detailed guidelines for managing PCBs, PCB-containing or PCB-contaminated articles and wastes, c) resource mobilization mechanisms for owners of PCBs and PCB wastes, d) availability of trained specialists, e) improved monitoring facilities, f) demonstration facilities, etc.

Project implementation will raise awareness concerning PCBs, assist in developing safety measures for personnel servicing of PCB-containing equipment, prevent further contamination of equipment and environment by PCB, and provide the environmental authorities with capabilities for environment monitoring and management at the national and local levels.

Organizational arrangements:

The Government of Romania through the Ministry of Environment and Water Management nominated the National Research-Development Institute for Environmental Protection (ICIM) to be the National Executing Agency and to provide coordinating activities at the country level. The institute expertise has been proven through their leading role in the country during the development of the NIP. Task teams will be established for the implementation of the activities of the project. Project related decisions and evaluations at the country level would be undertaken by a Steering Committee. The overall implementation of the project will be supported and monitored by UNIDO.

2. THE IN-DEPTH EVALUATION

2.1 Purpose

The purpose of this final evaluation is to enable the stakeholders to take decisions on the future and look at the impact and sustainability of the results obtained.

This evaluation will be based on the analysis of the Project Review/Financial Reports, technical reports, workshop reports and reports of the PM. The evaluation will determine the progress made towards the achievement of outcomes and will identify possibilities of correction if needed.

2.2 Scope

An in-depth evaluation is an activity in the project cycle that attempts to determine as systematically and objectively as possible the relevance, efficiency, effectiveness, impact and sustainability of the project. The evaluation will assess the achievements of the project against its objectives, including a re-examination of the relevance of the objectives and of the project design. It will also assess to what degree the assumptions/risks as identified in the project document held true and identify other factors that have facilitated or impeded the achievement of the objectives. While a review of the past is in itself important, the final independent evaluation is expected to lead to detailed recommendations for the future orientations and also lessons learned for the future.

In particular, the in-depth evaluation will pay attention to the following issues concerning:

Relevance

- Has there been any development in the demand/need for PCB related obligations in the country?
- How has been applied the concept of the project that aims to strengthen an environmentally sound management system (ESM) of PCBs, based on a consensus between relevant government authorities, the private and public sectors and NGOs.?
- Are the chosen strategies and target groups correct or should they being promoted with different strategies or should other target groups have been selected?

Efficiency

- Has the project reached the goals set in the project document and in the work plan?
  - Have the inputs provided (expertise, training) been of good quality?
  - Have been the activities undertaken in controlled, coordinated manner by protecting human health and the environment form the harmful effects of PCBs?
  - Has the project established a financially feasible management system for safe and environmentally sound phase-out and disposal of PCB and PCB-containing equipment?
  - How it was the project coordination?

Effectiveness

- Which activities of the project have been the most used (information, training, technical advice, policy advice…)?
- To what degree the elements of this management system, put into practice in three demonstration areas have been effective? These elements include the identification, labelling, safe collection, interim storage and disposal of PCBs.
- How effectively the tangible objectives of the project, which are the collection and environmentally sound disposal of 300 tonnes of PCB-containing equipment and the inventory of 8000 pieces of equipment, have been implemented?

- How good is the quality of the Public awareness activities, which have been implemented by the project and which are also important pillars of the project?
- How has been spread the awareness on PCBs and the Stockholm Convention at the environment related organizations of the Government, PCB owners, such as the main electrical utilities, the energy intensive industries, the hazardous waste management enterprises and disposal facilities?
- How good was the quality of the services provided by the project, by the consultants trained by the project or by any other institution providing these services?
- Is it possible a comparison between the services offered by the project and the services given by other service providers, if any?
- How the institutional strengthening and capacity building have been implemented and the guidelines developed?

Impact

- To what degree do the companies implement the measures developed for the good practice for maintenance, developed as part of the ESM of PCBs?
- To what degree do the companies continue implementing the interim storage of PCB-containing equipment?
- What is the economic and environmental impact?
- Is there any evidence of the application by the enterprises of the safety measures developed by the project as part of the ESM of PCBs document, for avoiding PCB releases from working equipment?
- To what degree has the project has influenced the implementation of PCB related legislations?
- How is going on the gradual elimination of PCB-containing equipment in the demonstration areas?
- How are working the laboratories available for PCB analysis and labelling?
- What is the present situation and how are operational the facilities upgraded for the interim storage of the PCB containing waste?

Sustainability

- What is the quality of the professional and managerial competence to sustain the activities?
- Where are the gaps and where are the strengths? What is the quality of the management system?
- How well have been the staff members of the institutions and enterprises trained for their tasks?
- Are there any sources of funding or direct income, current and potential?
- What arrangements can be made to strengthen the sustainability of the activities implemented by the project?
- What has been the efficiency and utility of the success indicators as applied by the project activities?

The conclusions of the Evaluation Team on these points will be reflected, where appropriate, as recommendations for the continuation and sustainability of the activities promoted by the project.

2.3 Evaluation Method

The evaluation team will:

- Study basic project documentation prepared on the project.
- Apply the evaluation methodologies utilized by the international institutions for the evaluation of the technical assistance projects.
- Interview in the field staff that has been involved in the management of the project.

- Study documentation and reports available.
- Visit and interview some persons that received training and some companies that were the subjects of the capacity building undertaken by the project.
- Interview other stakeholders and cooperating organizations or beneficiaries, such a ministries, regional or local administrations, consulting companies, etc.

Although the evaluation team should feel free to discuss with the authorities concerned all matters relevant to its assignment, it is not authorized to make any commitment on behalf of UNIDO, GEF or the Romanian Government.

2.4 Composition of the Evaluation Team

The evaluation team will be composed of the following:

- One international consultant, Team leader, specialized in methodology of evaluation of technical assistance projects.
- One international chemical or environmental engineer, familiar in evaluating achievements, success and shortcomings of technical cooperation projects dealing with the management of PCB containing equipment, PCB applications and disposal of electrical equipment.
- One national consultant with background as chemical or electrical engineer, experienced in the field of environment and with knowledge in analyzing achievements, success and shortcomings of projects in PCB treatment and disposal of POPs. Good knowledge of English required.

2.5 Timetables and Report

The mission will assemble in Romania and will visit the towns in which the demonstration areas of the project have been established.

On the basis of the preliminary analysis of the activities, it will be decided which institutions and companies will be visited. The respective project authorities are expected to provide substantive, administrative and logistical support in the field.

The mission will interview in Bucharest the National Project Coordinator, visit the National Research Development Institute for Environmental Protection (ICIM), which is the National Executing Agency and finally will meet in Bucharest the persons in the Ministry of Environment and Forests, involved in the project, to discuss and possibly comment on the draft conclusions and recommendations.

The evaluation report should follow a standard structure. In order to ensure that the report considers the views of the parties concerned and the possibility that they are followed up, it is required that:

- The main conclusions and recommendations be presented in draft and discussed with the development partners in the field and with UNIDO in Vienna

As the report is the product of an independent team of persons acting in their personal capacities, it is up to the evaluators to make use of the comments made by the parties involved and to reflect them as they think is the best in the final report. However, the evaluation team is responsible for correcting any factual errors brought to their attention prior to the finalization of the report.

The final joint report is to be submitted in Word to the UNIDO Project Manager by end June 2010 at the latest.

ANNEX II

Agenda of evaluation mission for project UNIDO GEF GF/ROM/07/001

"Capacity building for environmentally sound management of PCBs in Romania"

Saturday 15 May 2010	
9:00-19:00	Departure the national consultant from Bucharest to Timisoara Hotel accommodation in Timisoara
Sunday 16 May 2010	
After 12:00	Pick up the UNIDO consultants from Timisoara airport Hotel accommodation of UNIDO consultants in Timisoara Review the mission programme and suggest eventual adjustments, according with the latest information's
Monday 17 May 2010	
9:00-12:30	Visit PROAIRCLEAN Timisoara site Collection the relevant information related to the project and discussion on the implementation of project activities
12:30-14:00	Lunch break
13:30-15:00	Meeting the project local authorities: Regional Environmental Protection Agency and Local Environmental Protection Agency from Timisoara Collection the relevant information related to the project and discussion on the implementation of project activities
15:00-18:00	Studying the project documents, including reports, relevant notes of meetings, project plans etc. related with the relevant conclusion of the meetings and visits having in attention the draft of the report
Tuesday 18 May 2010	
9:00-18:00	Visit to the PCB owners on the selected sites by Regional Environmental Protection Agency and Local Environmental Protection Agency from Timisoara Collection the relevant information related to the project Studying the project documents, including reports, relevant notes of meetings, project plans etc. related with the relevant conclusion of the meetings and visits having in attention the draft of the report Interviews with project stakeholders to evaluate the following aspects of the project: vision, validity in local context, development, ownership and relevance of the activities
Wednesday 19 May 2010	
9:00-14:00	Departure from Timisoara to Filiasi Arrival in Filiasi
14:00-16:00	Visit DECOMEDIU Filiasi - temporary storage for capacitors
16:00-20:00	Departure from Filiasi to Bucharest Hotel accommodation in Bucharest
Thursday 20 May 2010	
9:00-11:00	Departure from Bucharest to Slobozia Arrival in Slobozia

11:00-12.30	Visit PROAIRCLEAN VIVANI Slobozia site Collection the relevant information related to the project and discussion on the implementation of project activities
12:30-14:00	Lunch break
14:00-16:00	Departure from Slobozia to Braila Arrival in Braila Hotel accommodation in Braila
Friday 21 May 2010	
9:00-13:30	Visit SETCAR Braila site with the experts from Local Environmental Protection Agency from Braila Interviews to evaluate the following aspects of the project: vision, validity in local context, development, ownership and relevance of the activities
13:30-15:00	Lunch break
15:00-18:00	Review the project documents, including reports, relevant notes of meetings, project plans etc. related with the relevant conclusion of the sites visit having in attention the draft of the report
Monday 24 May 2010	
9:00-12:30	Visit DECOMEDIU Braila site with the experts from Local Environmental Protection Agency from Braila Interviews to evaluate the following aspects of the project: vision, validity in local context, development, ownership and relevance of the activities
12:30-14:00	Lunch break
14:00-15:30	Meeting the project local authority: Local Environmental Protection Agency from Braila Collection the relevant information related to the project and discussion on the implementation of project activities
15:30-19:30	Departure from Braila to Bucharest Arrival in Bucharest Hotel accommodation in Bucharest
Tuesday 25 May 2010	
9:00-10:00	Meeting the project central authorities, including the experts from Steering Committee of the project, Romanian focal points for: Stockholm Convention and
10:00-12:30	Meeting the project experts from ICIM Collection the relevant information related to the project implementation
12:30:14:00	Lunch break
14:00-15:30	Meeting the project experts from National Environmental Protection Agency related the information on the project implementation
15:30-18:00	Review of the conclusions concerning the working day
Wednesday 26 May 2010	

9:00-12:30	Meeting the project team from ICIM especially concerning the laboratory analyses of the inventory samples.
12:30:14:00	Lunch break
14:00-18:00	Review all the documentations on the project, like expenditures, invoices, contracts, etc. Collection the relevant information related to the project implementation

Thursday 27 May 2010	
9:00-12:30	Final meeting with Ministry of Environment and Forests , ICIM, the GEF focal point for the presentation, and discussion about the findings, recommendations and lessons learned from the project
12:30-14:00	Lunch break
14:00-18:00	Review the project documents, including reports, relevant notes of meetings, project plans etc. related with the conclusions of the sites visit having in attention the draft of the report
Friday 28 May	
9:00-18:00	Final report preparation including findings, conclusions, recommendations and follow-up activities. Finalize the report by evaluation team(including breaks)

Road covered by the evaluation team in the period 15-28 May 2010

Source: http://maps.yahoo.com

A Timisoara, B Filiasi, C Bucharest, D Slobozia, E Braila

ANNEX III

List of Persons interviewed and Companies visited

Name	Institution	Location	Title
Ms. Doina Frantz	Ministry of Environment and Forests	Bucharest	General Director of Authority of Sectorial Operational Program, GEF Political Focal Point
Ms. Maria Elena Teodorescu	Ministry of Environment and Forests	Bucharest	Head of Technical Assistance Unit, Authority of Sectorial Operational Program, GEF Operational Focal Point
Ms. Adriana Stoica	Ministry of Environment and Forests	Bucharest	Counsellor, Pollution Control and Impact Assessment Directorate
Ms. Emilia Maria Niciu	Ministry of Health	Bucharest	Counsellor, National Institute of Public Health
Mr. Cristian Gheorghe	Ministry of Transportation and Infrastructure	Bucharest	Counsellor
Mr. Rosu Razvan	National Environment Guard	Bucharest	General Inspector
Mr. Nicu Bajan	ICIM (National Institute for Research and Development for the Protection of the Environment) - Ministry of Environment and Forests	Bucharest	Director General
Mr. Mihai Lesnic	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	National Project Director, Chief of Section
Mr. Dan Paduraru	National Institute for Research and Development for the Protection of the Environment – ICIM	Bucharest	Senior Researcher

Name	Institution	Location	Title
Ms. Carmen Munteanu	National Institute for Research and Development for the Protection of the Environment – ICIM	Bucharest	Chemist Chief of Laboratory, Member of Steering Committee
Ms. Roxana Dragan Paceagiu	National Institute for Research and Development for the Protection of the Environment – ICIM	Bucharest	Responsible for Legal Matters, Secretary of Steering Committee
Ms. Adriana Bors	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Chemist
Ms. Monica Radu	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Responsible for Monitoring and Database
Ms. Teodora Cristea	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Technician for sampling
Ms. Paula Catana	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Responsible for collecting PCB sample through national territory
Ms Dana Scutaru	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Responsible for collecting PCB sample through national territory
Mr. Sergiu Sandica	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Technician for sampling
Mr. Traian Parvulescu	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Technician for sampling
Mr. Gheorghe Pauna	National Institute for Research and Development for the Protection of the Environment - ICIM	Bucharest	Technician
Ms. Melania Gheorghiu	NEPA (National Environmental Protection Agency)	Bucharest	Counsellor in charge of PCBs

Name	Institution	Location	Title
Ms. Brandusha Petroaica	NEPA (National Environmental Protection Agency)	Bucharest	Director of Waste and Dangerous Chemical Substances Directorate
Ms. Simona Oprisan Stanescu	REPA (Regional Environment Protection Agency Timisoara)	Timisoara	Counsellor for Chemicals and Waste Management
Ms. Rodica Bolocan	EPA (Environment Protection Agency Timis)	Timisoara	Counsellor
Mr. Nicolae Strambeanu	PRO AIR CLEAN	Timisoara	Director General
Mr. Laurentiu Demetrovici	PRO AIR CLEAN	Timisoara	Technical Director and Quality management
Mr. Gabriel Tomescu	ELBA (Lighting Systems)	Timisoara	Logistic and Waste Manager.
Ms Daniela Mitroi	ELBA (Lighting Systems)	Timisoara	Responsible for Environment Protection
Ms. Maria Negret	ELBA (Lighting Systems)	Timisoara	Work and Environment Protection Inspector
Mr. Barboni Valeriu	COLTERM Power Plant	Timisoara	Engineer, Chief of Section
Mr. Petrica Pampu	COLTERM Power Plant	Timisoara	Chief Electrical Unit
Mr. Nicolae Zidaru	Transelectrica - Timisoara Electrical Transport Branch (National Company for the Transport of Electrical Energy)	Timisoara	Chief of Service Quality, Environment and Safety Department
Mr. Eugeniu Cicoare	GUBAN (Shoes Company)	Timisoara	Executive Director General
Ms. Monica Mateescu	REPA Craiova (Regional Environment Protection Agency Craiova)	Craiova	Coordinating Director
Ms. Ivancu Irina	EPA Dolj (Environment Protection Agency Dolj)	Craiova	Coordinating Director
Ms. Corina Buzatu	EPA (Environment Protection Agency Dolj)	Craiova	Counsellor
Ms. Constanta Sutu	EPA (Environment Protection Agency Dolj)	Craiova	Counsellor
Mr. Ion Petrisor	REPA (Regional Environment Protection Agency Craiova)	Craiova	Counsellor
Ms. Florentina Cretu	EPA (Environment Protection Agency Dolj)	Craiova	Counsellor
Mr. Nica Dumitru	DECOMEDIU (Filiasi) Waste disposal.	Filiasi	Chief Operator and controller interim storage of Filiasi
Mr. Cezar-Sorin Zamfir	VIVANI Hazardous Incinerator Company of CHINOX AG Group	Slobozia	General Manager of Environmental Deposit

Name	Institution	Location	Title
Mr. Gabriel Tanasescu	SIMTECH International	Bucharest	Technical manager for electrical equipment. and collecting samples National Expert
Mr. Melchisedec Covaci	Set Car S.A. (Waste disposal and treatment of Waste water)	Braila	Technical Director
Mr. Balan Sandu	Set Car S.A. (Waste disposal and treatment of Waste water)	Braila	Commercial manager
Ms. Mihaela Ionescu	Set Car S.A. (Waste disposal and treatment of Waste water)	Braila	Head of Foreign Relations Department
Ms. Nicoleta Negru	EPA (Environment Protection Agency Braila)	Braila	Chief of Dept. for implementation of environmental policies