GLOBAL PROGRAMME TO DEMONSTRATE THE VIABILITY

AND REMOVAL OF BARRIERS THAT IMPEDE THE SUCCESSFUL

IMPLEMENTATION OF AVAILABLE NON-COMBUSTION TECHNOLOGIES FOR

DESTROYING PERSISTENT ORGANIC POLLUTANTS (POPS)

SLOVAKIA (GLOBAL)

ANNEXES

(21Nov05)

CONTENTS

Annex 1: LOGICAL FRAMEWORK

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Overall Objective			
Long Term Objective: Demonstrate the viability of available Non-combustion technologies to destroy POPs. *Mid-Term Objective:* Demonstrate and remove barriers to the deployment of Non-combustion Technologies in several different country settings. *Short-Term Objective:* Deploy an immediately available and proven Non-combustion Technology to for the purposes of demonstrating the technology and sustainability of the project. The demonstration phase of the project, which is the subject of GEF funding, will destroy 2,500 tonnes of PCB-containing waste and equipment.	- Proven, Non-combustion Technologies identified, deployed and shown to perform in a technologically superior way in comparison with the combustion technologies and at competitive cost. - Barriers have been explicitly identified and evidence demonstrated that they have been effectively removed. - The selected technology has been transferred to Slovakia; it has successfully destroyed the targeted stockpile, and successfully addressed other waste matrices in the demonstration area. - Documentation of the experience within each of the long, mid, and short-term objectives has been carefully prepared and distributed.	- PMC documents generally - PAC meeting agendas and minutes - PSC and TAG meeting agendas and minutes - Terms of Reference of contractual arrangements with technology holders/vendors - Work plan - Business plan - Targeted stockpiles and associated waste matrices destroyed to the level of efficiency stipulated in the Project Document and elaborated by the Project TAG. - Technical reviews - Monitoring and Evaluation Reports - Audits	- Country, Civil Society, and Private Sector commitment to deployment of Non-combustion Technologies. - Barriers identified in the Programme and Project are capable of being successfully addressed. - Single country successes are able to translate into more regional and global applications. - There is the emergence, in a growing number of countries and globally of an effective regime for the use and promotion of BAT and BEP.

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Outcome 1: Improved capacity for environmentally sound management of POPs *Activities for Outcome 1: Establishment of Programme and Project Co-ordination and Support Unit located in Slovakia*			
- Recruit Programme Coordinator. - Recruit the National Project Director. - Assure cross-GEF and other project coordination and communication. - Plan and host needed Programme and Project Meetings.	- Project plan to effectively interact with related regional GEF International Waters (IW) projects and POPs projects regionally and globally. - Successful communication with GEF and other related programmes, conventions, and other relevant mechanisms verified. - Country Lead Agencies and senior lead officials identified and designated. - Establishment of the Programme Advisory Committee, the Project Steering Committee, and the Technical Advisory Group.	- Documented increased level of governmental participation in regional fora. - Increased extent to which explicit cross project and programme linkages are created and joint activities and cooperative arrangements documented. - Written records and reports of inter-project communications, workshops and cross-project field trips.	- The Executing Agency will move quickly to hire the Programme Coordinator, the NPD and other requisite staff. Delay in these recruitments will have a cascading effect of delays for the hire of support staff and the formulation of work plans. - IAs, other members of the various committees and cross-project country representatives will see it in their best interests to participate in inter-project co-ordination and co-operative activities.
Outcome 2: Destruction of 1,000 tonnes of PCB waste over the first 42 months of the GEF Project, transfer of non-combustion POPs destruction technology to Slovakia *Activities for Outcome 2: Tendering, Purchase, Design, Construction, Testing, Deployment, and Operation of Non-combustion technology leading to destruction of Targeted Wastes*			
- Tender and Purchase Capital Equipment. - Undertake EIA to satisfy Government legal requirements. - Design, construct, deploy and test Destruction Unit	- Contracts prepared and processed. - Country-driven environmental impact studies.	- Copies of contracts with UNIDO and NPD. - Approved work plan for the EIA and documentation of the process leading to satisfaction of Government requirements.	- Necessary contracts have been successfully negotiated and signed. - EIA fully satisfies Government requirements.

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
- Project Management Supervision (Monitoring) during technology transfer to Slovakia including, site preparation (construction) and performance tests (with limited chemical analytical sampling and testing). - Ensure necessary training of Project operational and managerial personnel (must be done in Slovakian) and effect technology transfer to Slovakia. - Provide on-site management, labour and required process chemicals and raw materials necessary to destruction activities. - Ensure the continuous supply of PCB wastes, PCB-containing equipment, etc.	- Documented evidence that the Destruction Unit has successfully been designed, constructed, and shown to operate according to design specifications. - Certification by the Vendor and by Project Management Supervisory personnel that training has been successfully undertaken and that a trained managerial and labour force is prepared to run the Unit - Vendor approval of and Project Management Supervisory personnel verification of successful site preparation consistent with operating needs. - Documented evidence that the necessary raw materials are or will be made available to the project.	- Written report by Project Management Supervisory personnel documenting the process of design, construction, testing, deployment and successful operation of the Destruction Unit. - Monitoring quality and quantity of releases (emissions and residues) of the reaction process. - Existence of training manuals and records of training sessions. - Site preparation plans and needs, as well as descriptions of site preparation activities maintained by NPD. - Records of management and labour hours worked, raw materials used, and results achieved.	- The selected technology operates according to design specifications. - The elements of sustainability described in the Sustainability section of this Project Document have been successfully met. - High quality training manuals including the required theoretical and practical information to make the users able to raise awareness and diffuse technologies. - Accurate accounting system to be kept for recording operating expenses.
Outcome 3: Destruction of 1,500 tonnes of PCB waste (consisting of contaminated PCB equipment and miscellaneous wastes of approximately 1 to 1 ratio) over the last 30 months of the GEF Project, transfer of sediment and soil extraction technology to Slovakia *Activities for Outcome 3:* ***Tendering, Purchase, Design Construction, Testing, Deployment and Operation of sediment and soil extraction technology***			

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
- Tender and Purchase Capital Equipment. - Design, construct, deploy and test of Sediment Extraction Unit - Undertake EIA to satisfy the government legal requirements. - Project management supervision (monitoring) during transfer of extraction technology to Slovakia including site preparation and performance tests. - Ensure adequate training of project managerial and operational personnel. - Provide on site management, labour, utilities and required chemicals and other raw materials to extraction and concentration activities. - Transport of concentrate to destruction unit.	- Contracts prepared and processed. - Country driven environmental impact assessment. - Documented evidence that the extraction unit has successfully been designed, constructed and shown to operate according to specifications. - Certification by the vendor and by project management supervisory personnel that training was successfully undertaken. - Vendor approval of the project management supervisory personnel, verification of successful site preparation. - Document the evidence that all required utilities and raw materials are available for extraction process. - Document the evidence that transport equipment is available for the PCBs concentrate.	- Copies of contracts with UNIDO and NPD. - Written report by Project Management Supervisory personnel documenting the process of design, construction, testing, deployment and successful operation of the Sediment Extraction Unit. - Monitoring quality and quantity of releases (emissions and residues) of the process. - Existence of training manuals and records of training sessions. - Site preparation plans and needs, as well as descriptions of site preparation activities maintained by NPD. - Records of management and labour hours worked, raw materials used, and results achieved. - Agreements leading to the final transfer of the Capital Equipment, and records of discussions and decisions leading to those agreements, kept in the offices of the NPD and UNIDO.	- Necessary contracts have been successfully negotiated and signed. - EIA fully satisfies Government requirements. - The selected technology operates according to design specifications. - The elements of sustainability described in the Sustainability section of this Project Document have been successfully met. - High quality training manuals including the required theoretical and practical information to make the users able to raise awareness and diffuse technologies. - Accurate accounting system to be kept for recording operating expenses.

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Outcome 4: Project effectively monitored, evaluated and disseminated and mechanisms in place to facilitate project replication and sustainability *Activities for Outcome 4: Effective, specific, and documented actions taken to ensure Project Replication and Sustainability (Capacity Building)*			
- Develop Monitoring Protocols and Evaluation framework and perform preliminary chemical analysis testing. - Ensure requisite level of Monitoring and Evaluation. - Assure a continuing and effective CEE level approach to Non-combustion technologies. - Assure continuing and effective CEE level Civil Society representation in Project activities. - Organize and Implement four additional regional workshops - Continue assessment of existing and emerging technologies that meet project selection criteria.	- Monitoring and Evaluation protocols approved and operational. - Monitoring and Evaluation timetable established and approved. - Regional (CEE) initiatives developed and implemented. - Civil Society (CEE-based) initiatives developed and clear execution modalities defined. - Civil Society committees established. Plans described for the four additional regional Civil Society Workshops. - Technical Advisory Group Terms of reference contain clear responsibility for and guidelines to continue technology evaluation. - Working committees comprised of Project Supervisory personnel, operating entity officials and others as necessary to write Operational manuals.	- Evaluation Framework on file. - Records of M&E activities undertaken, people involved, and results defined and made available upon request. - Plans for and records of Civil Society participation in Programme and project activities developed, distributed and maintained in the offices of the NPD and UNIDO. - Minutes of the TAG and relevant reports compiled, distributed and maintained in the offices of the NPD and UNIDO - Texts of M&E protocols and plan - Copies of all other relevant Programme and Project Reports distributed by, and maintained in the offices of the NPD and UNIDO. - Materials developed for and maintained in/on the Project Web site available publicly through the website.	- The approach represented by the Non-combustion Project has proven highly popular with significant elements of Civil Society. - As barriers are reduced or eliminated new technologies will be developed and enter the marketplace to compete with both traditional combustion alternatives and the relatively limited number of alternative technologies currently available.

Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
- Prepare/distribute full range of Programme and Project Reports. - Assure senior level Programme/Project representation at Stockholm and other related meetings and fora. - Project Web Site created and maintained.	- Clear deadlines and responsibilities developed to ensure development. Production and distribution of Programme and Project reports. - Calendar of relevant and important Programme and Project related meetings and other developed and maintained as a means of determining venues to be visited. - Physical evidence of the existence of a dedicated project Web Site.		
Outcome 5*:* Increased public/private partnership involvement *Activities for Outcome 5: Recruit additional donors to strengthen co-finance participation both from public and private sectors within the Programme*			
- Further develop a public/private partnership for additional donor co-finance. - Mobilize additional co-financing funds, if needed to implement public/private partnership activities that were unforeseen by the project during implementation	- Donor approaches planned and executed. - Systematic procedure established to use the GEF Programme to leverage other donors for direct and indirect support to Programme activities. - Increased donor support for direct and indirect assistance to Programme related activities.	- Relevant agendas and minutes of the PAC and the PSC.	- A key assumption is that once the promise of the deployment of these new technologies is realized in the first Project country, it will be possible to generate enthusiasm among donors to sustain and build upon the momentum that has been created through this first demonstration.

Annex 2: STAP TECHNICAL REVIEW OF GEF PROJECT PROPOSAL

Subject of the Review:

Project name: Programme to demonstrate the vialbility and removal of barriers that impede adoption and successful implementation of available, non-combustion technologies for destroying persistent organic pollutants (POPs)

Requesting country: Slovak Republic (first phase)

Scientific and technical soundness of the project:

Gas Phase Chemical Reduction (GPCR) is a non-incineration, hazardous organic waste treatment technology that is developed, patented and internationally accepted and tested. It is a process where hydrogen reacts with chlorinated organic compounds, such as PCBs, at high temperatures/low pressure yielding primarily methane and hydrogen chloride. Using of this technology demonstrated high destruction efficiencies for PCBs, dioxins/furans, HCB, DDT and applicability for all POPs including PCB transformers, capacitors, oils, and treating high strength POPs wastes. All emissions and residues may be captured for assay and reprocessing if needed. PCDDs/Fs have not been detected in the product gas from the process, but have been detected at low levels from natural gas burner used to heat reaction vessel. Due to the flexibility of the technology's front-end devices, several different waste matrices can be treated with a high degree of success.

Project clearly illustrates the basic differences between up-to-date more spread and preferably use combustion technologies and non-combustion technologies. The total destruction of chemicals in non-combustion technologies without secondary production of wastes and releases to the other compartments such as waters, soils or products is very important advantage of this type of technologies and from the point of view of Stockholm Convention they are very promising. This type of technologies is a nice example of environmental acceptable destruction technologies without additional harmful effects.

Project also clearly and reasonable describes the additional problems connected with combustion technologies such as expensive pollution control devices, sophisticated operations and management personnel. Maybe, it will be very useful for the description of advantages of these technologies to include here more facts such as a simple table, which will compare and clearly illustrate total destruction efficiency and economic analysis of this process and comparison with other possible technologies.

I must say that by my opinion is this technology very progressive and promising, but comparison and description of advantages must be based on the facts.

Background and justification:

The basic goal of the project is the using of successful and effective technology for destruction of obsolete POPs stockpiles in countries with developing economies and economies in transition. Project is based on the lacking of adequate and appropriate technical capacities to properly destroy obsolete stocks of POPs and/or to remediate POPs-contaminated environmental reservoirs in the countries with developing economies and economies in transition. In all countries of the region including Slovakia a strong resistance existed against the construction of technical capacity to destroy hazardous obsolete stocks or wastes from influential sectors of civil society. This press of public and NGO blocked progress in this field and unfortunately in many cases led to the illegal disposal or combustion of these wastes mainly during the first period of economical transition.

Using of good experiences from Australia and good acceptance by public in the comparison with other technologies is a good advertisement of this technology, on the other hand it will be perceived by the lobby of combustion and other technologies as abuse of Stockholm Convention for preference to another lobby. From

this reason, the advantage of this technology must be strictly done on the description of verified facts and data.

Identification of the global environmental benefits and/or drawbacks of the project:

Project is focused to the help with removing barriers to the further adoption and effective implementation of available non-combustion technologies.

This project is also very important for the developing of market with waste treatment technologies and broader competition.

Fitting of project within the context of the goals of GEF:

Project supports the Stockholm Convention requirements to ensure the use of non-combustion technologies and Best Available Techniques (BAT) and ensure Best Environmental Practices (BEP). Project is in agreement with the basic conclusions of SC especially concerning to the developing of strategies for identifying of stockpiles, products and articles in use and wastes covered by the treaty, after which they must manage the stockpiles in a safe, efficient, and environmentally sound manner. SC defines the ultimate elimination of the total releases. From this point of view the evaluated project is a good example of this approach, which respects all basic conclusions and approaches of SC.

The Stockholm Convention proposed for POPs destruction technologies that they should prevent the formation of dioxins, furans and other by-product POPs, prevent the release of dioxins/furans and other by-product POPs, not generate any wastes with POPs characteristics, avoid POPs disposal methods which are non-destructive (e.g. landfilling, recycling, deep-well injection, etc.).

From the point of view of Stockholm Convention requirements, the non-combustion technology such gas-phase chemical reduction is fully acceptable technology.

Regional and/or global context:

The project is example of potential joint and useful collaboration between international bodies such as GEF and national authorities (local Government) and local private sector for future efforts, which will be undertaken pursuant to the Stockholm Convention.

Important aspect is that the real regional hotspot was selected for this model study and results can be very useful for other GEF Projects in this part of Europe or in other part of Globe. This hotspot was recognized and described also in the Regional Report of GEF/UNEP Project "Regional Based Assessment of Persistent Toxic Substances" as one from the most polluted site in Europe (and probably round the world).

Demonstration of this technology in the region of Central and Eastern European countries is very suitable, because a lot of countries in this part of Europe have huge amount of obsolete POPs mainly chlorinated pesticides and PCBs and this project can serve as example of effective method for solution of this problem (all CEE countries including former GDR).

Project Design:

Project very detailed, describes potential barriers and risks of project realization.

The most important topic of information campaign concerning to the application of this technology is to describe to Civil Society that is necessary to destroy all obsolete POPs stocks and contaminated wastes because the present disposal and storage in unacceptable and potential dangerous for the environment and human. There are a lot of examples from previous campaigns that the facts concerning the toxicity, dangerous properties and the necessity of environmentally acceptable destruction, were obscured. It is extremely important from the local experiences with EIA procedure, which is necessary to prepare very clearly. EIA can be the most crucial point of project realization. Agency can expects potential problems from the side of other waste lobbies and procedure and EIA documents must define and describe all potential advantage and disadvantage of this technology, comparison with others and especially "zero variant" – the case when waste stay in the stocks without destruction. A lot of obstacles can be expected in this case.

Evidence for government commitment and sustainability:

The sustainability is described. The Government of Slovakia participated as a full partner in Preparation. Very important in this case is real guarantee of government; not only promise and it can be slow and uncertain process.

In the description of Nature of existing regulations and standards is unfortunately describes the general situation in the CEE countries, but not real situation in Slovakia. It means that Project Brief does not describe present Slovak legislature concerning to the application of this technology, problems which are connected with the transport of wastes, decontamination of Širava Lake, etc. and all other legal obstacles and barriers.

Financial sustainability is based on the contribution of Slovak Government and Chemko Corporation. This commitment undertakes a minimum of a seven-year programme of operations for this technology. Very questionable is what will be done in the case of negative results of EIA for decontamination of Širava Lake. Also the possibility of application of wastes and stocks from other countries of region is more dream and wish of NGO and agencies than reality. In this moment the regulations concerning to export/import of hazardous waste must be changed and it means that all countries of region must define this approach in their National Implementation Plans and discuss more concrete about this possibility. But this proposal is a little bit speculative. This topic must be discussed on the Regional meeting of countries with enabling projects and seriously transferred to the national authorities. Again a lot of obstacles are a possible expected in this case basically given by local and national interests. How will be the position of the Government of Slovakia and especially NGO to the transport of hazardous waste across the whole country for example from the Czech Republic?? Is it a realistic and possible to expect any official steps of the Government of Slovakia in this field?? It is very important for these countries for the solving and planning of their own problems with obsolete POPs stocks and development of their National Implementation plans.

Slovakia disposes by acceptable amount of contaminated wastes, which makes a possible to start with demonstration project very early. But the stream of wastes must be covered fluently especially after destruction of waste from Chemko Corporation dumps and stocks.

Project also describes non-technological and non-market barriers. This description is based on the national experiences and reflects reality of the countries with economy in transition. But there are again more of general remarks than the real description of Slovak problems. For example, the more detailed and concrete description of status of Slovak waste markets with detailed analysis of waste disposal services, regulations in this field, list of licensed companies, will be much more usefulness.

Replicability of the project:

Experiences gained during the project realization in Slovakia can be very helpful for other countries especially as far as the better understanding of potential barriers during project implementation in other countries. This project can lead to optimum procedure with using of all Slovak experiences and results, what can be important especially as far as the applications in other CEE countries.

Project funding:

Project will be funding by GEF, the Government of Slovakia and Chemko Corporation. As I mentioned, the guarantee of national partners should be suitable if will be done officially as soon as possible.

The items of incremental costs and project financing tables look reasonable, but it is impossible to evaluate during the short period and without more detailed description of them, how are realistic.

Time frame:

Project supposes the realization in four countries with the respect of country specificity. From this reason project define project objectives, outputs and activities including the basic structure of organization, long-, mid- and short-term program objectives and all outputs and activities. This definition is realistic and will be as I supposed detailed specify in every country specific project.

Time frame depends on the financial covering and official acceptance of the project including the EIA procedure, which can be time-consuming part of realization.

Linkages to other programs and action plans at regional or sub-regional levels:

Direct linkage with the development of National Implementation Plans in the Parties through GEF funded Enabling Activities exists and can be very useful as a potential additional application of this technology or potential future co-operation of countries of Central Europe in the destruction of waste in Slovakia. The experiences and information from the Slovak Project realization should be a valuable resource to these countries.

Other beneficial or damaging environmental effects:

Projects also briefly summarize global benefits for other GEF projects such conservation of biological diversity or improved water quality and explain the potential effects of environmental present POPs for these global problems.

Degree of involvement of stakeholders in the project:

The role of stakeholders in the phase of Project preparation is described as a unique and can be very helpful during the future steps of project implementation and realization. Project will organize and covered some additional workshops and activities for better public understanding of the project.

Summary:

The Project "Program to demonstrate the viability and removal of barriers that impede adoption and successful implementation of available, non-combustion technologies for destroying persistent organic pollutants (POPs)" has a great relevance to global and regional solution of POPs problems as far as the destruction of obsolete POPs stocks, wastes and contaminated environmental matrices such as soil or sediments.

The evaluated technology fully respects the requirements of Stockholm Convention as far as the technologies suitable for the solving of POPs containing stocks and wastes. The project application for four regionally distributed model countries is reasonable and good experiences from these model realizations can be a good example for other countries from these regions.

Project defines expected risks and barriers, which can be limited steps for application in the developing countries and in the countries with economy in transition.

Based on my professional experiences, I consider this project as very well prepared and selected technology as suitable for the destruction on POPs stocks and wastes without additional harmful environmental releases.

I recommend this project to accept.

Brno, 03/03/2003

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Annex 2a: RESPONSE TO STAP TECHNICAL REVIEW

The STAP review is overall very positive regarding every relevant technical and scientific aspect of the Programme and Project. The STAP review does refer to several sections that could be strengthened and these comments have been taken into account. Specifically:

STAP Reviewer Comment:

Maybe, it will be very useful for the description of advantages of these technologies to include here more facts such as a simple table, which will compare and clearly illustrate total destruction efficiency and economic analysis of this process and comparison with other possible technologies.

UNIDO's Response:

One of the barriers identified in the Project has been that of a paucity of technologies that meet Project selection criteria. Further, a critical determinant of the final selection of the most appropriate technology to be deployed for the Slovakia stockpile, which contains very difficult to treat solid PCB containing wastes, was that of selecting based on the ability of the technology best suited to this matrix. It also was based on the need to select that technology which would demonstrably minimize human exposure to PCB wastes of very high PCBs content. The process of selection is explained in the Project Brief in the barriers reduction section under B.2 *Limited number of vendors*. In summary the technology will be selected through a two tier (technical and financial) international tendering process carried out in accordance with UNIDO Financial Rules and Regulations and Procurement Manual.

Notwithstanding this explanation of the technology selection process, the development of a Table consistent with that which the STAP reviewer has suggested is a constructive one. Table 3 of the STAP Review of Emerging, Innovative Technologies for the Destruction and Decontamination of POPs gives such a comparison (www.unep.org/stapgef/documents/pops2003.htm). The performance data of the direct applicable technologies with considerable experience as shown in this referred Table are as follows:

GPCR	>99.9999% DE
BCD	>99.99% DE
Solvated electron technology (SET)	>99.9% DE
Sodium reduction technology	<0.5 ppm PCB removal

STAP Reviewer Comment:

There is an expressed concern of the consequences in case of negative results of the EIA in relation to Sirava Lake.

UNIDO's Response:

The possibility of negative results from the EIA is a risk and one the current draft has not addressed. The Project Document now includes a section on risks (F.1 Possible Risks).

STAP Reviewer Comment:

The STAP reviewer questions the predictability of sufficient waste matrices to be available for the destruction unit. In this regard he raises the issue of the potential difficulty that might be inherent in current Slovakian legislation and regulations concerning the importation of wastes from other countries. He further suggests that further detailed analysis of waste disposal services, regulations in this field, and a list of licensed companies would be useful.

UNIDO's Response:

The critical issue that is suggested by the above comment is one of project sustainability. On page 45 is a table displaying the prospects for sustainability of the use of project capital equipment that is likely to substantially exceed the life of the GEF funded demonstration activities. Further, there is the possibility that the Visegrad 4 Countries: Hungary, the Czech Republic, Poland, and, of course, Slovakia may form a sub-regional close alliance at which time it may become possible to accommodate some of the POPs and other PTS from this sub-region. The STAP reviewer correctly points out that this is speculative, and yet even without this development the prospects for sustainability of the Project are in our judgment very high.

The suggestion that a concrete analysis of the waste markets in Slovakia be undertaken is a constructive one and this will be undertaken as an early activity under project implementation.

Annex 2b: GEF COUNCIL MEMBERS COMMENTS

WORK PROGRAM: COMMENTS FROM COUNCIL MEMBERS
(Reference to GEF/C.21/Inf.14 May 14-16, 2003)

Persistent Organic Pollutants

Slovak Republic: Global Programme to Demonstrate the Viability and Removal of Barriers that Impede the Successful Implementation of Available Non-combustion Technologies for Destroying Persistent Organic Pollutants (POPs) (UNDP/UNIDO, GEF: $10.612 m, Total Cost: 20.686 m)

Comments from Germany

- There is an inconsistency between the text of the Project Logical Framework, Section on Overall Objectives: Sources of Verification and Assumptions and Risks in the Project Executive Summary, dated 2 April 2003, and the respective section in the Project Brief, Annex 2, dated 8 April 2003. We consider the Project Brief of 8 April 2003 to be the relevant project document. In further project documentations the respective texts should be consistent.
- We support the view of the STAP, particularly the concerns raised with respect to the crucial role of the Environmental Impact Assessment (EIA) for the project realization. Even if the risk of a negative EIA seems to be very low, the outcome of the EIA will be the main argument to demonstrate the viability of non-combustion technologies. Because this is one of the main project objectives, the critical consideration of the results of the EIA should be mentioned at prominent place throughout the project description.
- The intended application of the Gas Phase Chemical Reduction Process must be monitored carefully with respect to the quality of the emissions and residues of the reaction process. We suggest including these aspects in the key indicators, assumptions and risks section and in the Project Logical Framework, Output 2, under Assumptions and risks: “EIA fully satisfies Government requirements”.
- Energy consumption (heat for high temperature process), economic impact and the destruction costs, including the entire logistics of running the facility, e.g. provision and disposal of reaction gases, must be evaluated in comparison to other, particularly conventional combustion technologies. All these finding must be presented as appropriate to all stakeholders for transparency and open discussion.
- The commitment of the Government of Slovak Republic and the private industry to co-finance the project is a major driving force for the implementation of the project. Due to the high innovative character of the project, the perceived risks of the project are too high to attract private sector finance without considerable additional grant funding. Therefore, written guarantees or confirmations of commitment by the co-financiers should be available before the project starts to avoid slowing down or uncertain the implementation of the project.
- In conclusion, confirmation of contributions and changes should be made during further planning steps and during project implementation.

Recommendation

It is recommended to take the above comments into account during further project planning and implementation.

Comments from Switzerland

General Commentaries

The project is designed in conformity with GEF policies and guidelines. It is built upon a partnership between the public and private sector. The support of civil society and the private industry is assured on different levels. Financial sustainability will be significantly supported by the private sector. Out of a single country success the results will be translated by efficient information and technology transfer to globalise applications.

Main Concerns

- Technical feasibility is described and has been proven in different applications mainly in industrialised countries. Special attention will have to pay on technical project preparation and technology implementation and operation in respect to the local circumstances.

- A market study showing the potential of the implemented technology on the regional and/or global market will support the motivation of potential vendors to invest in new projects.

- A detailed listing of the technology evaluation process would be helpful to understand the choice of the selected principle.

- It would be very useful to work out the differences in investment and running costs of the different technologies in relation to the destruction efficiency.

- A potential alternative solution to the chosen non-combustion technology should be evaluated if the expected efficiency of the technology is not achieved or a negative environmental impact analysis will occur.

Conclusions and Recommendations

The project preparation has been elaborated in detail and the main goals are clearly outlined. The set-up of the project with an important contribution of the private sector in strong cooperation with the civil society and public organisations, donors and authorities give a maximum chance for a successful implementation. The need of evaluation and implementation of non-combustion technologies and their major advantage of no secondary waste releases is clearly illustrated. Special attention should be given to the costs related to investment and operation of a full-scale plant in relation to the market potential for destruction of existing POP stockpiles. After successful implementation of the Slovak project, financial sustainability (without GEF funding) will be a key success factor for more globalize applications.

Comments from France

Description of the project

The objective of the proposed project is to develop a Program which will demonstrate the viability of the use of non-combustion technology in the destruction of obsolete POPs in four countries: China, Philippines, Slovakia and one to be defined African country. The project, which is related to Slovakia Republic, is submitted for GEF co-financing as the initial project of this Program. The experience gained in implementing this initial Program will be useful in implementing the Program in other concerned countries. During the preparation activities, it was assessed that the best available technology (BAT) which meet the Stockholm Convention (SC) requirements and provide sufficient confidence and maturity to be used in cleaning up the

existing stock of POPs is the Gas Phase Chemical Reduction (GPCR) technology. This technology showed good performance in POPs destruction, especially PCBs in Australia and to less extent in USA, Japan and Canada. Only one vendor is able to provide this patented technology. In order to achieve the main goals of this project, 3 main activities were identified:

- set up of a full size plant using the GPCR technology. This plant will be located in the site of the main Slovak pesticide producer,
- assistance to the country in adopting the legislation and regulation framework,
- evaluation of the implementation of the various components.

The necessary budget for carrying out these activities is estimated at US $ 20 155 040, from which USD 10,004 040 are requested to the GEF, with the following detailed breakdown (USD):

Component	GEF financing	Co-financing	Total
Program and project coordination	665,000	460 000	1 125,000
Equipment and operating costs	7 779 000	6,831 000	14 610,000
Replication	769 000	1 290 000	2 059,000
Resource mobilization	50 000	1,570, 000	1,620,000
Executing agency support cost	741 040		
Total	10 004 040	10,151,000	20,155,040

The project duration is expected to be 4 years.

Comments:

Policy issue

1) The Slovak Republic ratified the Stockholm Convention on POPs and therefore is qualified for receiving assistance from GEF. However this Country will be also be soon member of the European Union and therefore the preparation of accession is ongoing. As future member, the Slovak Republic should gradually improve its environmental regulations in order to meet the European Environmental Standards. The Specialized European Bodies (EBI, BERD, Commission, etc.) provide assistance financial to the future member states in order to assist them to meet these environmental requirements. Therefore, we wonder if European countries are not providing double contribution: for this projects: one time through European Financial Aid bodies and another time through their contributions to GEF. In order to avoid this double contribution it should be clearly assessed what are the activities under the submitted project already funded and/or expected to be funded by the by European Aid bodies and to re-calculate the real contribution of the country to the project.

Technology choice

2) The technology proposed for Slovak Republic is the Gas Phase Chemical Reduction (GPCR) technology. Even if we are in favour of this technology, which was successfully used in Australia in the POP destruction Program, the justification for it final choice is not completed. The use of other possible technologies was not enough investigated. For instance it is stated that, compared to the GPCR technologies other technologies (like Sodium reduction process, Base Catalyzed Dechlorination, solvated electron process) have a limited commercial-scale operation experience. Even if this is true, it should be also noted that the use of GPCR has only one concrete and commercial application, which was in Australia. The other experiences mentioned in the project (USA, Japan and Canada) could not be considered as commercial applications. We believe that in order to provide a more comprehensive and documented evaluation of the existing and possible technologies, further commercial and technical investigation is necessary.

Project Costs

3) Several assumptions need to be clarified and costs do not seem to be fully justified:

   a) The tonnage of PCB and other POPs to be destroyed during the project implementation are not clear. For instance in the annex 1 (page 3), the base line scenario mentions a volume of 1,000 tons of PCB to be destroyed. In the table named "Incremental Costs and project financing", under the item "component 2" page 6, it is mentioned that 6,300 tons of POP waste will be addressed. In paragraph 32, page 11 in the project documents other figures are mentioned: 1,000 tons of PCB manufacturing solid waste, 250 tons of PCB oil, etc… In summary we are not clear if the project consists of demonstrating the technology through the destruction of the 1,000 tons of PCB identified, or if the goal of the project is to destroy the entire volume of POPs waste identified and/or probably existing.

   b) The equipment and operating costs seem to very high: the GPCR technology was analyzed in 1994 by the USEPA[1]. The analysis was positive and showed that this technology is efficient and able to achieve all regulatory levels without any restrictions. As result of the economical analysis, the USEPA report concluded, "the treatment costs ranged from a low of USD 1,670/ton to a high USD 2,000/tonne, depending of the utilization factor (from 60% to 80%)". The report also mentions that for higher scale applications, much lower costs should be expected: from USD 670 to USD 550 in the same conditions (table 15 page 24 of the mentioned above report). In these conditions, even if it is planed to destroy the 6,300 tons, the total cost will be about USD 3,5 millions[2] (instead of the about USD 5.7 millions indicated). Therefore the economical benefit of using this technology instead of the classic combustion technology is high. This should be taken into account in the final calculation of GEF grant.

   c) Moreover the incremental capital cost claimed seems to be very high. For instance, what is the justification for "design, construction and testing operation at vendor's" at a cost of more than USD 1.1 million? We assume that this is already included in the technology transfer cost.

Recommendation

1. The relevancy of providing grant to nearly EU member state is questionable, mainly EU GEF donors (double contribution).
2. If the technology choice seems to be sensible, the justification for not having considered other technical options needs to be further explained.
3. Costs levels seem to be unrealistic and should be considerably reduced.
4. Volume of PCB to be destroyed during the project should be clearly indicated.
5. Capacity treatment of the pilot plant should be indicated.
6. The use of the plant after completion of the project should be clarified (will be used for other POPs and/or other waste chemicals).
7. Capital and operation costs of other indicated existing plants in particular that of Australia should be used as benchmark for the evaluation of the same costs in the project in Slovakia.

[1] Document reference: EPA/540/AR-93/522 – September 1994. Contract n°68-C9-0033

[2] According to the evaluation carried out by the USEPA mentioned above, the treatment unit cost for large facilities is about USD 550 per tonne. If one applied this unit cost for 6 300 tonnes, the total cost would be USD 3 465 k.

Comments from the United States

Slovakia Non-Combustible Destruction Technology

The United States recognizes that this technology demonstration will provide useful information on a potential non-combustion technology to treat POPs wastes, but we are concerned with allocating a relatively large amount of money to a technology demonstration when we have pressing financial needs from many countries trying to take the initial steps necessary to ratify and implement the Stockholm Convention. Moreover, the summary document has serious gaps on many issues that are of concern to us (e.g., cost effectiveness, sustainability, replicability, etc.). These concerns should be addressed and gaps should be filled in prior to CEO endorsement. A description of specific concerns follows:

Priorities: As we stated at the recent GEF Council Meeting, the United States believes that the areas of work set out in the GEF Business plan are all reasonable, but that much higher priority needs to be given to *Targeted Capacity Building* and *Implementation of Policy/Regulatory Reforms and Investments* than to performing technology demonstrations. Focusing resources on these areas will allow for the most effective use of available funds to facilitate efforts of countries to initiate action on POPs, such as by performing emissions inventories or taking immediate actions to deal with high-priority POPs pollution problems. We believe technology demonstrations are a lower priority than many other activities the GEF undertakes to facilitate Stockholm Convention implementation. Consideration should be given to taking necessary measures to reduce the costs to the GEF of this and future demonstration projects, possibly by reducing the duration of demonstrations to the minimum time necessary for validation, or focusing on only the highest technology priorities.

Cost: We view the costs of this project to be high in comparison to the potential benefits associated with the proposal. The proposal involves more than half of the project cost being funded by the GEF to demonstrate a technology in one country - Slovakia. It is unclear how applicable the results of this demonstration will be for the situation in many developing countries. We are also concerned that the project costs are nearly three times the baseline case, raising the question of whether this technology will be truly be cost-effective. We view the benefit of this project is demonstrating the viability of the technology and we believe it is possible that a shorter project may be adequate to achieve the project goals.

Technology Selection and Information: Additional information would be helpful that describes the other combustion or non-combustion technologies considered as a part of selecting a technology that is likely to be viable in a large number of countries. The proposal indicates that this project has already been applied commercially; a full description of its commercial viability based on existing experience, and the incremental benefits to be accrued from the proposed project should be more fully described. Costs from existing operations should be relied upon to evaluate the likely success of the proposed project.

Comments from France of 24 June 2004 on UNIDO responses

We thank UNIDO for the responses provided with respect to the issues raised by France on the mentioned above project. However if France acknowledges that the 1st and 2nd recommendations are broadly addressed, our delegation has still some concerns regarding the project costs and the implication of the technology choice on the incremental costs and the implementation process:

1. Costs:

   UNIDO states that at this stage, it is not possible to provide GEF's Council with information regarding the costs since the technology is not yet defined. We are pleased to know that UNIDO agrees on our comments on the technology choice and we welcome the initiative of a bidding process. However, we also pointed out that this project should be further refined and that its approval be deferred until the technology has been chosen: since the incremental costs are relative to the investment and operational

costs, UNIDO is not in a position to provide GEF's Council with the relevant information regarding the cost of the project and thus the funding sought from the GEF. Moreover, UNIDO indicates that industries have different options before them for POPs destruction, and that the new facility will be subject to competition from other facilities. This fact was not clear in the previous project document. In this case, the operational incremental cost should take into account the current cost paid by industries (in the previous project document this cost was considered as nil).

2. Volume of POPs concerned by the project:

   France still does not understand what the POPs tonnage during the pilot phase will be. UNIDO states that the nominal capacity is 1,000 tonnes per year and that the effective capacity is 750 t/y. Therefore, during the whole project duration (4 years), the facility should be able to process around 3,000 tonnes of POPs. It is 2 times more than UNIDO indicates (response on project costs, 7th line, UNIDO indicates 1 500 tonnes to be destroyed during the pilot phase period).

Recommendations:
1) to defer the approval of the project, till technology has been chosen,
2) to request UNIDO to provide precise information on investment and operational costs,
3) to request UNIDO to take into account the costs paid by industries for POPs destruction in calculating the incremental costs,
4) to request UNIDO to consider the costs of destruction for only 1,500 tonnes in estimating the incremental costs.

Comments from Belgium of 22 June 2004

Although I have taken note of the response to Council Members' comments following the May 2003 Council Meeting, I believe that the updated and reviewed document still contains several shortcomings, e.g. inconsistencies in and between the Business Plan and the Workplan.

It is not clear to me what the exact amount of PCBs is that will be destroyed, since the document mentions different numbers in different places. While the stockpile at the Chemko Company looks well established, I don't find an unequivocal justification for the rest of the 7550 T. It would seem that 2550 T. are the result of a survey in the context of the Slovakian National Implementation Plan (equipment and capacitators, miscellaneous waste and pesticides), which is not well documented, but especially the 4000 T. condensate of soils and sediments is posing a problem. Not only does the PCB content of the soils and sediments seem very high but I don't see any activity planned for actually obtaining the 40.000 T. and bringing them to the extraction unit.

The above has a direct consequence for the cost-efficiency of the project, which remains very high. Indeed, as long as the other quantities of PCBs are not sure, the project is basically about destroying the 1000 T stockpile, for the amount of 20 million USD. And if I understand the letter of the private operating entity correctly, this would also be the amount for which the operating costs are covered. What about the rest, assuming it is accounted for? I would also like to flag that the baseline cost for incineration seems exaggerated.

With regard to the choice of technology, I believe that there is a lack of comparative analysis to support an optimal selection. That said, the project document mentions, on various occasions, the GPCR technology as the most likely candidate. Technically GPCR may be acceptable but the company that commercialises it is not in a good economical condition, and this raises serious questions about the success of the project. Has this been taken into consideration? Fortunately, there will be an international tender to which, I expect, all STAP-endorsed technologies will be invited in a transparent way.

What puzzles me most, however, is the fact that the Chemko Company, the first and most interested party, has not committed itself to the project, although it is supposed to provide funding and its property as the

working site. Indeed, there is no letter of any kind included or annexed to the project document and I wonder why that is.

Equally pre-occupying is the designation of the two private companies: one that will implement the project and the other that will provide waste management services. What process has been followed in their selection? Since the technology has not been selected, how could this be done? Has due attention been paid to GEF's principles on engaging the private sector? Have the rules of fair competition, including those of the European Union, been considered?

There are several other observations that could be made and details that could be given to show that the project is not ready for final approval. In the interest of the new POPs Focal Area and the first major GEF project in this area, I strongly suggest that Council should have another look at it.

Annex 2c: RESPONSE TO GEF COUNCIL MEMBERS COMMENTS

1. Germany

All the recommended comments from Germany have been taken into account during the preparation of the Project Document. The detailed response of UNIDO is given, point by point, as follows:

The inconsistency between the text of the Project Logical Framework, Section on Overall Objectives: Sources of Verification and Assumptions and Risks in the Project Executive Summary, dated 2 April 2003, and the respective section in the Project Brief, Annex 2, dated 8 April 2003 was a simple editorial error and has been reconciled in the Project Document in its Annex 1. Abbreviations are used in the Logical Framework as appropriate. Please note that the list of acronyms and abbreviations is given on page 4 of the Project Document.

UNIDO agrees with the STAP reviewer comments related to the importance of the Environmental Impact Assessment (EIA) that was not fully addressed in the Project Brief as correctly stated in the comments of Germany. In the Project Document the requirement for an EIA has been recognized and covered widely. The requirement for EIA is described in para 26 to 30 in Environmental Context, in para 68 in Environmentally Sustainable Economic and Industrial Development, in Immediate Objective of the Project under Activity 2.2, in para 121 in Possible Risks, and further in Annex 1: Logical Framework, Annex 5: Work Plan and Annex 5a: Business Plan. The operating costs and economic analysis are provided in the Business Plan included in Annex 5a. The EIA will be carried out as the first substantive activity of the Project though due to the time constraints posed by the Slovakian legislation on PCBs, namely that all PCBs stockpiles has to be destructed by 2010, other activities concerning the first administrative steps towards the transfer of non-combustion technology will overlap. It should also be noted that the 1st Project Steering Committee (PSC) meeting will precede the commencement of EIA and the 2nd PSC will be held close to the completion of EIA. The reason of this timing is that though the risk of a negative EIA seems to be very low an immediate remedial action could be taken to rectify the situation.

The STAP technical workshop held in Washington, D.C., 1-3 October 2003 reviewed the emerging, innovative technologies for the destruction and decontamination of POPs and concluded that the lack and/or inadequate information on the recent development of these technologies not only for the public but also in the professional circles is a barrier for technology diffusion (www.unep.org/stapgef/documents/pops2003.htm and GEF/C.23/Inf.19) Further to initial assessments as described in project documentation to date, the project will further initiate an international tendering process based on project selection criteria, to determine the most appropriate technology for deployment. The international tendering for technology selection will be one of the first activities of the project (see Annex 5, items 26-37). The Project Technical Advisory Group (TAG) in its 2nd meeting agreed that the project should only consider the deployment of technologies that are in category 1 of the above STAP Review: Direct applicable technologies with considerable experience. The Terms of Reference for this bidding process is given in Annex 4. Furthermore, the TAG in its 1st and 2nd meetings agreed that any technology to be selected and used had to be demonstrably safe. In order to achieve the highest possible level of occupational safety during the destruction of POPs, an interpretation of the project's criteria was introduced for use in the identification and selection of technologies to be applied. The project's criteria already specified that the technology should operate in an essentially closed system. This was interpreted to apply, not only to the selected technology's main reactor vessel or chamber, but to apply to the totality of the destruction system including required pre-treatment operations. The initial hazardous substances to be destroyed, as well as any by-products that might be generated unintentionally during the chemical processing, shall be kept in this closed system and recycled and/or destroyed. Finally, the monitoring requirements of all releases (air emissions, liquid effluents and solid residues) as well as the language "EIA fully satisfies Government requirements" was included in Annex 1: Logical Framework as

requested. We would add here that Monitoring and Evaluation are deemed critical to Project success. The Project has committed US$ 565,000 for this purpose, with the GEF contributing US$ 110,000 for M&E.

The energy consumption, economic impact and the destruction costs including the entire logistics of running the facility will be evaluated in comparison to the conventional combustion technologies as one of the objectives of this demonstration project as described in para 98 in Immediate Objective of the Project. All these findings will be presented to all stakeholders in the PSC meetings and to a larger audience of the Regional Workshops (Activity 4.6), the Civil Society (Activity 4.5), the Stockholm Convention related international fora (Activity 4.9) and through the Project Web Site (Activity 4.10). The time schedule of these activities is shown in the Work Plan (Annex 5). It should also be noted that the Business Plan of the Project (Annex 5a) has been based on the premises of our best experts' opinions on capital costs including site preparation and operating expenses compared to a bottom line cost of PCBs incineration in Slovakia.

Co-financing letters from the Government of Slovakia, other public sector entities and the private sector are included in Annexes 14 & 15. The confirmation of the financial support clearly shows the commitment of the project stakeholders. The relevant co-financing figures are as follows: Government of Slovakia: US$ 2 million and Public Consortium: US$ 1.0 million, the operating entity: US$ 2.2 million, Chemko company for the final PCB destruction: US$ 1.921 million. Additional US$ 2.0 million will be paid by PCB wastes and contaminated equipment owners in relation to collection, transport and disposal. A total of US$ 9.121 million. UNDP as the implementing agency, UNIDO as the executing agency and the Environmental Health Fund as principal cooperating agency have also made financial commitments.

In conclusion, the confirmation of contributions has been given and changes requested to be made in the Project Document have been made as requested.

2. Switzerland

While stating that the Project Brief has been designed in conformity with GEF policies and guidelines and built upon a partnership between the public and private sector supported by the civil society Switzerland expressed several main concerns. UNIDO's response to these concerns is given, point by point, as follows:

The STAP technical workshop held in Washington, D.C., 1-3 October 2003 reviewed the emerging, innovative technologies for the destruction and decontamination of POPs and confirmed the Swiss statement that the non-combustion technologies have been applied only in the industrialized countries. In a few economies in transition the introduction of these technologies has just been commenced but information has not been made publicly available yet on these applications. Hence, it can be easily justified why the first demonstration project on non-combustion technologies should be implemented in Slovakia. The technical project preparation and technology implementation and operation in respect to the local circumstances in Slovakia are of utmost importance. The successful planning and execution of the Project will be assured by the very strong political and financial commitment of the Government of Slovakia and the public-private partnership (a close coordination between the local industry and the Consortium of Public Sector represented by the most influential stakeholders) supported by the civil society (NGO community) who are the principal drivers of the project. The engagement of a highly qualified Programme Coordinator and National Project Director as well as technical personnel with the elaborated monitoring and supervision arrangements included in the project will further minimize the risks. Regular reviews by and reporting to the Programme Advisory Committee (PAC), the Project Steering Committee (PSC) and the Technical Advisory Group (TAG) will also provide assurance that implementation will be in accordance with planned outputs and activities.

The STAP technical workshop held in Washington, D.C., 1-3 October 2003 reviewed the emerging, innovative technologies for the destruction and decontamination of POPs and classified the technologies according to the level of their development into five categories (1. Direct applicable technologies with considerable experience, 2. Applicable technologies on the stage of a 'breaking through and/or start of

commercialization, 3. Technologies that given the right financial circumstances could be full scale within approximately five years, 4. Technologies in the stage of laboratory scale testing and 5. Technologies, which are unlikely to be applicable for destruction of POPs stockpiles). With regard to timelines for new technology development, the workshop agreed that they are 3-4 years for research to pilot scale, another 3-4 years for pilot scale to near commercialization, and 5-7 years for near commercialization to commercialization. The STAP technical workshop documents are available on its web site (www.stapgef.unep.org). This information based on experts' opinion may well motivate vendors to invest in new projects. Further, the very active participation of the private industry in the UNEP Chemicals and Swiss Government sponsored PCB Consultation Meeting held in June 2004, Geneva, demonstrated very clearly their interest and motivation. As far as the subject project is concerned the performance of the demonstration of the selected technology will be presented at Regional Workshops with a view of developing a CEE strategy. The latter will include evaluation of the regional market for the application of the non-combustion technology. The three other regional workshops will present a market study showing the potential of the non-combustion technologies in the respective regional markets.

The final selection of the non-combustion technology will be done through a two tiered (technical and financial) international tendering process based on the Terms of Reference included in Annex 4. The technical considerations and criteria of technology selection will follow those agreed by the STAP technical workshop referred above and the TAG in its 1st and 2nd meetings. The 2nd meeting of TAG had agreed that the project should only consider the deployment of technologies that are non-combustive in nature and in STAP category 1: direct applicable technologies with considerable experience. In addition, the TAG rejected technologies such as pyrolysis and plasma arc for deployment in this project based on the TAG's consideration and application of the technology selection criteria that are detailed in the approved Project PDF B Document. The Technical Advisory Group (TAG) in its first and second meetings also agreed that any technology to be selected and used had to be demonstrably safe. Along this line the third criterion of technology selection is that the technology should operate in an essentially closed system and thereby protect operators and the environment.

The capital and operating costs of the selected technology in relation to its destruction efficiency (DE) will be determined through this demonstration project. However, those technology holders that have not been selected would not open up their books due to intellectual property rights and commercial confidentiality. The STAP technical workshop referred above gives some experts' estimates on the costs incurred.

The vendor to be selected through a transparent international tendering process will be required to provide guarantees on the performance of the technology. To give some more details of the Terms of Reference (Annex 4), it can be noted that the vendor should apply the best practice in destroying the POPs stockpiles. Its mechanical, electrical performance and safety guarantee as well as the technology introduced should be in accordance with the international practice and standards. The vendor should guarantee that parameters related to the performance of high quality are met during the commissioning and trial runs/start up. The vendor guarantees the quality of all the work specified in the above. The vendor guarantees that its supply and services will be provided in the agreed quantities and quality and according to the international standards within the agreed time frames and contract costs. The prerequisite for this, however, is that the operating entity fulfils in full measure its responsibility in line with the time frames of the project. In case the expected efficiency of the selected technology would not be achieved or a negative EIA would occur, a potential alternative technology will be evaluated.

Switzerland concluded and recommended that special attention should be given to the capital and operating costs of a full-scale plant in relation to the market potential for destruction of existing POPs stockpiles. As it is shown in the Business Plan (Annex 5a) the financial sustainability will be ensured throughout the life of the project. If it would be achieved it will definitely be a key success factor for technology diffusion in the global market.

3. France

The comments of France first describe the project, then makes specific comments and recommendations. The response of UNIDO is given, paragraph by paragraph, as follows.

i. Policy issue: Slovakia ratified the Stockholm Convention on 5 August 2002 and the Ministry of Environment has prepared new PCB regulations as part of the Waste Management Law that came into force on 1st April 2004. This law foresees the elimination of PCBs stockpiles by 2010. If this legislation would be enforced effectively, illegal traffic and reuse can be prevented, all storage sites identified and all PCB-containing equipment either cleaned and retrofilled or replaced, it is possible to decommission the entire stock of PCB-containing equipment and dispose of all PCBs wastes in Slovakia. There are only two projects funded by the specialized European Bodies (EBI, BERD, Commission, etc) that have relevance to the eastern Slovakia region that is the region of the subject project, as follows: (1) Phare project SR 9920 – Technical assistance for finalization of the project tourism development in Zemplinska Sirava, and (2) ISPA project - Improvement of waste water treatment and sewage system on selected municipalities surrounding Zemplinska Sirava lake. None of these two projects overlaps with the subject project and consequently funding from EU Aid bodies is not available. Therefore there is no need to re-calculate the real contribution of the country to the project. The relevant co-financing figures are as follows: Government of Slovakia: US$ 2 million, Public Consortium: US$ 1 million, the operating private entities: US$ 6.121 million. The total amount is somewhat higher than it was in the Project Brief, namely US$ 9,121,000 instead of US$ 8,904,300 without co-financing from UNDP, UNIDO and EHF (NGO Community). Furthermore, it should be noted that remediation activities that are not a part of this project are of high priority for public sector in the region. It is their wish to use all relevant sources including structural funds to develop and implement decontamination strategy. To do decontamination activities in the extent, as it is needed in Zemplin Region of Eastern Slovakia for PCBs cleanup would require large financial resources. To be able to mobilize the needed resources the Public Consortium has decided to establish a Fund Raising Unit to coordinate such activities among the interested parties at local, regional and state level. The success of these fund raising efforts will also be reported.

ii Technology Choice: UNIDO agrees with this particular comment. The STAP technical workshop held in Washington, D.C., 1-3 October 2003 reviewed the emerging, innovative technologies for the destruction and decontamination of POPs and reached the same conclusion as the comment of France that the lack and/or inadequate information on the recent development of these technologies not only for the public but also in the professional circles is a barrier for technology diffusion. Further to initial assessments as described in project documentation to date, the project will further initiate an international tendering process based on project selection criteria, to determine the most appropriate technology for deployment. STAP and also UNIDO further reviewed the emerging, innovative technologies and the UNEP Chemicals and Swiss Government sponsored PCB Consultation Meeting held in June 2004, Geneva, gave further very useful information on several new alternative technologies that could be considered. Further details on the bidding process are given in Annex 4: Terms of Reference.

iii. Project Costs: The referred inconsistencies in tonnage have been corrected. The project will destroy in its demonstration phase 2,500 tonnes of difficult to treat, PCB-containing wastes and equipment (a large number of capacitors) and a further 5,050 tonnes of PCB-containing wastes and equipment in its sustainability phase. A Chart has been prepared and appears in the Project Document describing the demonstration phase, and a second Chart describing the sustainability phase.

The original concept was that the demonstration project should destroy at least 1,000 tonnes of PCBs that is located at the project site of Chemko Corporation in the form of PCBs manufacturing solid waste. However, the Business Plan of the Project (Annex 5a) shows that the financial sustainability of the operations in the demonstration project can only be achieved if the total existing PCB stockpile in Slovakia is eliminated. The total current, known inventory is 7,550 tonnes. In light of this and in considering the nominal capacity of the

destruction unit, total tonnage to be destroyed during demonstration phase (two years design/construction, four years operation) will be 2,500 tonnes, including the 1,000 tonnes of highly contaminated solid PCBs wastes (capacitors) as well as other stockpiles in the country in accordance with current inventories from the Enabling Activities project preparing the National Implementation Plan of the Stockholm Convention in Slovakia. The exact current costs for destruction of the POPs wastes will be determined and reported very transparently based on the actual costs data gained from the project. The demonstration project aims at the comparison of the costs of applying a selected non-combustion technology to those of the traditional hazardous waste incineration as the findings of the STAP technical workshop shows that the capital and operating costs experienced in the industrialized countries cannot be applied directly in a developing country or an economy in transition. However, it should be noted that the Business Plan of the Project (Annex 5a) has been based on the premises of our best experts' opinions on capital costs including site preparation and operating expenses compared to a bottom line cost of PCBs incineration in Slovakia. To reach the goal – attract PCBs waste owners to use non-combustion technology for destruction of PCBs wastes – it is essential not to exceed the average price of waste disposal by incineration in the Slovakian market. Otherwise the waste owners will choose the cheaper solution and the demonstration facility would face problems to keep a constant inflow of waste input for operating the unit. In this respect the final selection of technology has to closely evaluate different technologies to address specific PCB stockpiles in Slovakia.

The incremental capital cost has been calculated based on benchmark figures teased out from publicly available information (documents and reports) and estimated for such line items as construction costs, shipment and storage costs, etc. At the early stages of project development it was felt that design, construction and testing of destruction equipment might be more cost effectively carried out at the vendor's site. This presumption might still be true for activities such as design and construction of certain unit parts, but these activities will be carefully reviewed and carried out at the vendor's site only in special cases when it is deemed necessary.

Recommendations: 1. The issue of double contribution has been addressed in (i). 2. The issue of technology choice has been addressed in ii). 3. The issue of project costs has been addressed in (iii). 4. The volume of PCBs to be destroyed during the demonstration phase of the project funded by GEF will be 2,500 tonnes, and further 5,050 tonnes during the sustainability phase, for a total of about 7,550 tonnes. 5. The nominal capacity of the pilot plant is 1,000 tonnes per annum, but the effective capacity is only about 750 – 800 tonnes per annum as indicated in the Business Plan (Annex 5a). 6. The pilot plant will be used beyond the demonstration phase of the project as the business plan covers a period of 10 years. 7. The GPCR facility in Australia, that was decommissioned a couple of years ago, was made for an industrial scale operation. Therefore that experience would not be comparable with the demonstration project. However, if used as a benchmark for possible approximate cost of the pilot demonstration project in Slovakia, due to the economy of scale, the subject project will be significantly less expensive. Furthermore, it should be noted that all STAP category 1 technologies have made significant improvements in recent years and therefore the status of ten years ago cannot be compared with that of today.

4. United States of America

The United States recognized that this technology demonstration would provide useful information on a potential non-combustion technology to treat POPs wastes but expressed several concerns. UNIDO responses to these concerns are given as follows.

Priorities:

More GEF resources are already notionally allocated to POPs SP-2 "Targeted Capacity Building and Implementation of Policy/Regulatory Reforms and Investment" than to POPs SP-3 "Demonstration and Promotion of Innovative and Cost-effective Technologies and Practices". The actual figures from the GEF Business Plan FY04-06 (GEF/C.21/9) are US$ 96 million versus US$39 million (or 71% versus 29% of

allocations for the POPs focal area). Indeed UNDP and UNIDO are assisting a large number of countries (22 and 40 countries respectively) to prepare their NIPs, and each of the IA's/EEA's is presently developing a large portfolio of NIP implementation (e.g. POPs SP-2) projects. Outside of the Non-Combustion demonstration programme, and the GEF-UNDP-WHO demonstration project on best practices in health care waste management to reduce dioxin and mercury emissions (presently in preparation), we are not aware of any other major POPs demonstration/SP-3 activities in preparation. Furthermore, the demonstration of non-combustion technologies is strictly in line with the Stockholm Convention, which seeks to promote Best Available Techniques (BAT) and Best Environmental Practices (BEP). Moreover, as hazardous waste incineration is the first item in the list of Part II: Source Categories of Annex C of the Stockholm Convention that source categories have the shortest timeframes for BAT to be phased in [Article 5 (d) and (f) (vi)], this demonstration project is not only of high international relevance but its implementation is very timely. As indicated in the project document, some of these non-combustion technologies have far superior destruction efficiencies as compared to incineration and thus avoid the generation of releases from unintentional production. The total project duration of 6 years is necessary because the international tendering, technology selection and production of equipment and its delivery would take one year; the technology transfer, installation of equipment, trial runs would take another year; and two years would be required for the demonstration period addressing targeted stockpile from the formal production of PCB and another 2 years to address the stockpiles in state sector and private sector in accordance with the National Implementation Plan and related legislation which is partly implemented and partly under preparation. The demonstration period of four years is reasonable to ensure effective technology transfer and compile comprehensive data on the actual performance of the technology. Continuous monitoring of the demonstration project over the four-year period by all stakeholders including non-governmental organizations will enable informed decisions on future work on non-combustion technologies in the framework of the Stockholm Convention.

Cost:

On the question of costs, we have consulted with Dekonta, s.r.o., an experienced Slovak company with a history of dealing with PCB waste export and disposal. Dekonta is familiar with the current Slovak market price for legally disposing of PCB contaminated waste. According to Dekonta, today's price in the Slovakian market is 80Sk/kg +/- 15 Sk/kg that is US$ 2.4 – 2.8 per kg. Since Chemko has agreed to pay the facility operator up to US$1.921 per kg for the destruction of 1,000 tonnes of wastes using the non-combustion facility to be deployed under this project, and has committed, in writing, US$ 1,921 million in co-finance, and since Ekoslužby has committed, in writing, an additional US$ 2.2 million in co-finance, it is clear that partners consider this price per tonne reasonable under current market conditions and have decided that the potential for mid and long term, profit-making sustainability is real and worth the risk they are undertaking by way of their financial commitment (see Annex 14). The price between Chemko and Ekosluzby is lower taking into account mostly operational costs. Collection of wastes and transport will not be needed due to the fact that wastes are stored in the area.

The Ministry of Environment will address the entire known inventory of Slovakian PCB waste and, by way of its US$ 2.0 million co-finance guarantee to the Project (Annex 14), facilitate the long-term sustainability of the GEF funded Demonstration Project. Holders of PCB product in the Slovak Republic would be paying at least a competitive price to service providers which will be selected in transparent process inviting licensed entities to collect, transport and store PCBs wastes, which will be then delivered for destruction using the non-combustion destruction technology that is ultimately selected.

It must also be recalled that this project was initially proposed as a barriers reduction project on the understanding that project criteria would lead to the selection of emerging, innovative technologies that are commercially available and have substantial operating experience, but may not have the long years of operating experience needed for their full economic optimisation. While the STAP report recommends there should be investments made in emerging non-combustion technologies, newer technologies may additionally benefit from barriers reduction assistance before they are capable of fully competing, head-on, with highly capitalized and very mature older technologies such as waste incineration (which themselves were often

subsidized in an earlier period and in certain cases even now). Nonetheless, the business plan for the Slovakia does make good business sense and is responsive to the actual market conditions in Slovakia.

Technology Selection and Information:

The STAP technical workshop held in Washington, D.C., 1-3 October 2003 referred previously reviewed the emerging, innovative technologies for the destruction and decontamination of POPs and gave special consideration to the application of non-combustion technologies in developing countries and economies in transition. In developing countries and economies in transition the transfer and application of non-combustion technologies requires a whole range of considerations, as follows:

A. When on site destruction technologies are applied special considerations should be given to:
   - Complexity of the conditions and situation of the site and stockpile;
   - Hazards of incomplete removal and destruction;
   - Environmentally sound management;
   - Implication of transfer of a single technology;

B. Characteristics of stockpile sites;
C. Logistics of application of non-combustion technology;
D. Comparative criteria;
E. Adaptation of non-combustion technology:
   Performance;
   Costs;
   Input wastes;

F. Adaptation of project site to the technology:
   - Resource needs;
   - Costs;
   - Environmental impact;
   - Industrial and occupational hazards;
   - Constructability;
   - Output Waste;
   - Type and quality of matrices;
   - Capacity building needs.

UNIDO would like to emphasize the importance of only one item from the above list of considerations. Each technology that might be selected has to be adapted to the particular nature of input waste and the waste matrices. The nature of the waste will significantly determine the applicability of the technology. Therefore the simple fact that a given technology has already been applied commercially does not automatically mean that the same technology would perform identically or even similarly if the composition of wastes and the nature of waste matrices were significantly different. In the case of Slovakia a substantive part of the waste is solid waste generated by commercial scale manufacture of PCBs. The waste can be physically characterized as a resinous glue type of solid mass that is completely different from more or less diluted PCBs oils. Hence through the demonstration project a unique experience that is not yet available will be gained. Based on the above, costs of existing operations cannot be compared in a simple, direct way but needs a thorough review and evaluation that will be carried out during the demonstration phase of the project.

Response to comments of France dated 24 June 2004

Thank you very much for extending to UNDP and UNIDO the opportunity to respond to the comments of the Government of France with regard to the final project document for the GEF Project titled *Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs)*.

France lists four Recommendations that it feels should be considered further to GEF CEO endorsement of the Project document. These include:

1. to defer approval of the project, till technology has been chosen;
2. to request UNIDO to provide precise information on investment and operational costs;
3. to request UNIDO to take into account the costs paid by industries for POPs destruction in calculating incremental costs; and
4. to request UNIDO to consider the costs of destruction for only 1,500 tonnes in estimating the incremental costs.

With regard to Recommendation 1., we explored the possibility of completing the technology selection process before submission of the Project Document. However, UN rules prohibit initiating tendering for such technology procurement until project funds are officially released to the Executing Agency, e.g. once the final project document has been signed by UNDP, UNIDO and the recipient government. We can make available to you the relevant UN requirements should you wish to see them.

Recommendation 2. requests more precise information on Project investment and operational costs, and Recommendation 3. requests that UNIDO take into account the costs paid by industries in calculating the incremental costs. We wish to address these two Recommendations at once.

We believe it is important at the outset to note that, in accord with GEF's POPs Strategic Priority Number 3, this is a *Demonstration Project* aimed at *Barrier Removal* for non-combustion technologies, rather than strictly an investment project (S.P.# 2). As a Demonstration Project aimed at removing barriers to the deployment of such emerging, innovative technologies in developing and transition country settings, we did not apply an investment based incremental cost analysis, and, given the demonstration and barrier removal nature of the Project, defined the cost of capital equipment, the deployment of the equipment and testing, and the cost of global activities associated with the Project and Programme, as wholly incremental. We had originally used the GPCR technology as the technology upon which to base Project budget estimates as it was the technology that emerged as the most promising option at that stage based on the assessment of the Project Technical Advisory Group (TAG). However, following guidance received from the Council at the time of work program consideration, the final technology selection will be subject to a two-tiered (technical and financial) international tendering process following strict technology selection criteria as developed by the TAG; this process and criteria are fully described in the final project document.

In relation to the request to provide more specific information on costs associated with the project and the overall Slovak commitment to address its entire known stockpile of PCB product, we hope the following is helpful. The total GEF allocation for the Slovakia project component of the Global Programme, including capital purchase, training, and testing amounts to US$ 7.779 million. Total *operating* costs investment, part of private sector co-financing from Ekosluzby, is estimated at approximately 2.2 million and in addition Chemko has guaranteed to pay for the destruction of 1,000 tonnes of PCBs wastes from its formal production amounting to US$ 1.921 million.

Thus, in summary, the Project, through its barrier removal approach, will facilitate the Slovak Republic's commitment to address its entire known inventory of 7,550 tonnes of PCB materials in various matrices. It is this larger, multi year effort, which will ultimately test the extent to which the GEF has been successful in reducing barriers to the deployment and sustainability of available, non-combustion technologies for the destruction of POPs in developing and transition economies.

Recommendation 4. requests that UNIDO consider the costs of destruction for only 1,500 tonnes in estimating the incremental costs. Further to this Recommendation is the question of the tonnage of PCB to be addressed by the GEF contribution, and the 4-year duration of the overall Project. France correctly notes that the duration of the Project is to be four years, that the effective capacity of the technology is 750 tonnes per year, and thus there appears to be a discrepancy between the four year life of the project and the tonnage that has been targeted for destruction during the project time frame, e.g. it should be 2,500 tonnes rather than 1,500 tonnes. It should be noted, that actual proposal is in fact for a six year Project, the actual operation of

the technology, and actual destruction of PCB materials would occur in years three to six, which, given the effective destruction capacity of 750 tonnes per year, yields the target of 2,500 tonnes. The full timeline for the six years of GEF Project activities can be found in Annex 5 of the Project Document. The first two years of the Project are necessary to undertake tasks such as:

- The Process of Tender and Final Technology Selection;
- Permitting (EIA and related matters);
- Design and Construction;
- Testing and Commissioning;
- PCB Waste Collection and Storage;
- Staff Recruitment and Training;
- On-site Testing and Commissioning;
- Stakeholder Workshops to Finalize Public Participation and Involvement, including public input into, and involvement in Monitoring and Evaluation Activities; and
- Development of Monitoring and Evaluation Protocols and overall Monitoring and Evaluation Plan.

The question of calculating the incremental cost for the targeted 1,500 tonnes that will be the subject of the GEF sponsored Demonstration Project has, we believe, been addressed as part of our response to Recommendations 2. and 3.

Again, we would like to thank the Government of France for offering us this opportunity to address its concerns, and we hope that these responses to your inquiries clarify the points you have raised and would welcome any further questions you may have or points that you believe require further clarification.

Response to comments of Belgium dated 22 June 2004

During the inventory preparation for PCBs as part of the National Implementation Plan preparation for the Stockholm Convention, the documented volumes of POPs chemicals are in general increasing with the exception of cases when these chemicals are being disposed. Even in developed countries such as Germany, it was reported in the PCB Consultation Meeting held in Geneva in June 2004, authorities have found new PCBs inventories. Therefore, notwithstanding of certain inconsistencies in the project document that have been corrected, it is not surprising that the PCBs inventories are increasing in Slovakia. The most recent inventory shows that instead of the earlier registered 31,000 pieces of PCB-containing equipment there are more than 40,000 pieces. Mr. John Buccini, instrumental during negotiations leading to adoption of the Stockholm Convention, has said that "NIP is not a destination but a journey", hence one can expect that the PCBs inventory in Slovakia is a dynamic entity that is very likely to increase in the coming years.

UNIDO fully agrees with the Council member from Belgium that the PCB content of the soils and sediments in the close vicinity of the Chemko Company seem very high. It is really very high, and that is why this area of Eastern Slovakia is widely considered to be the number one PCBs hotspot not only in the region, but also worldwide. It is higher than the limits of the Stockholm Convention of 0.05 percent [Annex A, Part II (a)(ii)]. According to chemical analytical tests the sediment in certain extreme sites contain 53 kg PCBs per tonne of soil, that is the soil contains 5.3 % PCBs. In the industrial canal of 5.3 km length, about 3 m wide and as an average about 1.5 m deep, during those 25 years of manufacturing PCBs it has accumulated a considerable amount of sediment very highly contaminated by PCBs. Therefore the 4,000 tonnes of extracted and concentrated sediment is a very conservative estimate. The soil desorption unit is described in Annex 4, page 46. Since the soil desorption unit should be operated as an integrated part of the destruction unit, we could not select the soil desorption technology before the selection of the destruction technology by an international tendering process. However, the desorption unit will be a mobile unit that in a closed system will reduce the volume of the sediment and increase its PCBs concentration at the site of the sediment before moving to the destruction unit.

The volume of PCB-containing materials and equipment to be destroyed during the project life is depends on the nominal capacity of the equipment to be selected through the international tendering process and the scheduled activities described in the Workplan. The Business Plan and the Workplan is based on our assumptions estimated with a destruction unit of 1,000 tonnes per annum nominal capacity. The actual annual capacity of such a piece of equipment would be about 750-800 tonnes with any of the commercially available technologies. We have based our calculations due to the very nature of any demonstration project on a capacity of 750 tonnes per year.

Taking into account that the project has a 4-year duration, of which the tendering, manufacture and installation of the equipment as well as the EIA will take the first 24 months (year 1 and 2), the demonstration activity from the 3rd and 4th year and the evaluation of the demonstration and dissemination of experience gained and lessons learnt in the last six months of the 6th year, the volume of PCB-containing materials and equipment will be 2,500 tonnes. The 2,500 tonnes is an estimated figure based on the above assumptions and could change somewhat depending on the final technology to be actually selected. However the private sector and the local authorities will continue to use the destruction unit for the PCBs waste destruction and disposal of extract from PCB contaminated sediment, therefore in another five-year period by 2016 approximately 5 x 750 tonnes = 3,750 tonnes

The composition and volumes of the PCBs waste matrices ("the firm numbers") can be found in the NIP for the Stockholm Convention in Slovakia and also in para 124 of the Project Document and the two charts that immediately follow para 124.

In light of the above, we do not believe that there would be any "inconsistencies in and between the Business Plan and the Workplan". At this point we would like to respond to the statement that "While the stockpile at the Chemko Company looks well established, I don't find an unequivocal justification for the rest of the 7550 T." The very justification comes from the Business Plan that shows a long-term financial sustainability of the project in the case that all PCB wastes would be destroyed in Slovakia. The Workplan has been prepared accordingly.

Incineration costs vary according to the daily market offer and demand and have been received in the range of US$ 800 to US$ 7,000. According to Dekonta, today's price of PCBs incineration in the Slovak market is 80Sk/kg +/- 15Sk/kg that is US$ 2.4-2.8 US$/kg for the customer including collection and transport. Single cost for incineration in Fecupral Company in Presov town is 70Sk/kg without manipulation and transport in 2005. Based on this we do not believe that the baseline cost to have been exaggerated. Indeed, our assumed cost may turn out to be a conservative estimate.

UNIDO would like to note that ***technologies*** were considered by the Project, not vendors of technologies. It is for this reason that vendor's names do not appear in the final project document. They appear only in the TAG meeting reports in Annex 9 and 9a (pages 86 to 97, respectively) reviewing the commercially available non-combustion technologies. Consistent with this, the international tendering will invite technology holders rather than vendors to bid due to the simple fact that several private sector entities might provide the same technology. Hence the comment from Belgium that "Technically GPCR may be acceptable but the company that commercializes it is not in a good economical condition, and this raises serious questions about the success of the project" is not relevant. GPCR technology is referred only and along with some other technologies in sections B.2 Limited Number of Vendors and in F.1 Possible Risks. In the annexes GPCR technology is referred to in our response to the STAP review, the GEF Council Members' comments and in the TAG reports.

While developing a public-private partnership for the project implementation several private and public entities have shown interest to participate. The private entities have committed themselves to participate with co-financing irrespective of the result of the international tendering process to select the technology. These private companies are active in Slovakia in hazardous waste management and interested in engaging new projects in the country to widen their portfolio.

Annex 2d: GEF Work Program (GEF/C.24/5) - For Review by GEF Council, November 17-19, 2004

U.S. Technical Comments of 3 December 2004

On the issue of UNIDOs assertion that $30 9 million of the POPs funding should be for these demo projects, we believe that estimate is too high. As we indicated earlier we want to see funding directed to meeting the obligations of the convention before we commit a significant percent to demonstration projects. We would note that the FY 04-06 GEF business plan was not approved by the Council, so these figures cannot be cited as agreed. Moreover, we would point out that the GEF-3 POPs targets (page 36 of attachment 1 to the GEF-3 agreement) call for five technological packages in each of the listed categories, and lists the technologies as: "environmentally safe destruction of obsolete stockpiles of POPs, including non-combustion technologies, technologies to prevent or minimize emissions of POPs as by-products of industrial processes; and development of alternatives to POPs -- pesticides and industrial chemicals, including IPPM; site remediation through various means, including bioremediation; alternatives to DDT in malaria vector diseases control." This project would use a substantial portion of demonstration funds for only one technology, leaving little room for the other important technology introduction work planned for the replenishment period.

The cost-effectiveness issue is a significant problem here, and has not yet been satisfactorily addressed. The GEF 3 replenishment indicates that technology introductions would be tested for cost-effectiveness. The project proposes spending $19.4 million to treat what they could export for destruction for about US$7.5 million. While some additional costs are incurred because this is a demonstration, the project still appears to fall short with respect to cost effectiveness. Moreover, the long-term sustainability of this project from a cost-competitiveness standpoint appears highly questionable. If the non-combustion technologies are already commercialised, as is claimed in the background documents, why are they being demonstrated? Wouldn't it be cheaper to simply visit existing sites?

In this connection, if the project goes forward, it must be done in a cost-effective manner, and we therefore welcome the decision to open the bidding process to a competitive lender. It will be important to ensure that the process is open, transparent and fair so that it does not favour one company or technology over another. Such tender processes typically are on the basis of both quality and cost.

As a new member of the EU, Slovakia is questionable as an optimal demonstration location. The choice of Slovakia is further called into question because it does not allow POPs waste imports. This is a significant downside with respect to long-term sustainability and a serious flaw in the site selection, although this problem could be overcome if technology and equipment are portable.

We request further clarification with respect to the baseline costs for incineration.

The project document should refrain from attempting to interpret the Convention. This occurs in several places, including page 10 paragraph 17 where it appears to be saying the Convention 'favours' destruction technologies that can minimize/eliminate POPs releases to all media. In fact, the Convention allows for treatment with technologies that don't achieve complete elimination.

If the project moves forward, it needs to be a dispassionate demonstration of non-combustion technology. The project description strays into the realm of being an advocate for the technology, but the evaluation needs to be an unbiased appraisal of its technical and economic merits, or there is no value to be gained from it. The analysis of destruction efficiency should also be rigorous and account for any residuals that are not desorbed from the source material as well as the creation of any dioxins related to heat or energy provided to the process.

U. S. position: The US can withdraw its opposition to this project provided the Secretariat prepares a review of POPs resource allocation, with an indication of how all five technology packages will be funded out of the limited resources for this focal area, given the other, higher priorities for POPs. The U.S. will oppose any

further technology demonstration projects until this allocation issue is resolved. The U.S. also requests responses to the points above.

Response to the U.S. Technical Comments of 3 December 2004

UNDP and UNIDO would first like to thank the Council member from the United States for the constructive comments and recommendations on the POPs Non-Combustion project document submitted for CEO endorsement in May 2004. Following requirements under the GEF Instrument, the project document was reposted on the GEF web site as a discussion item under the November 2004 Work Program agenda item.

Following receipt of Council comments, UNIDO and UNDP, in consultation with the Slovak government, private sector and NGO partners, undertook an extensive revision of the project document to fully address these concerns and to strengthen and harmonize the overall presentation. This process was recently completed and the revised document went through the final review by the Slovak government who have expressed their continued strong political and financial support for the project. In short, the revised project document addresses and incorporates the following issues raised by Council:

1. Inconsistencies in the document with regard to the size of the stockpile to be destroyed during both the GEF project time frame and the post-project operational phase;
2. The specific capital and operating costs of the likely candidate technologies;
3. The typical costs paid by European and Slovak industries for PCB waste destruction using traditional incineration technologies;
4. Questions regarding the stated very high PCB content of soils and sediments in the major PCB hot spot located in the Kosice region of Eastern Slovakia;
5. The roles and responsibilities of the different private sector partners including Chemko and Ekoslužby;
6. Proposals to identify and pre-select the specific non-combustion technology prior to the initiation of project implementation; and lastly; and
7. Clarifications regarding the absence of specific vendor names in the final project document.

We hope that these brief remarks effectively describe the steps UNIDO and UNDP have taken to address the recent concerns raised by some Council members on the project document submitted for CEO endorsement. Following the Council discussion and guidance on any remaining issues in November 2004, UNDP and UNIDO requested Council support to continue its current dialogue with the Slovak government and project partners towards completion and resubmission of the substantially revised project document for CEO endorsement.

In this process the technical comments of the United States have been specifically addressed as follows:

1. The cost effectiveness of this demonstration project depends upon a wide range of project components such as the bidding process with most probably 5 to 10 bidders (vendors of different technologies), the technology transfer process, the capacity building component, the technology dissemination component, the logistics of virtual PCB elimination in Slovakia (transport, temporary storage, continuous steady supply of PCB wastes in public and private sector, addressing PCB waste hotspots in Slovakia, etc.
2. The demonstration project through an open and transparent project management should verify the weights of those components and will determine cost-effectiveness.
3. In addition, the project will destruct 2,500 tonnes of PCB wastes and materials over the six years of the GEF Project, and destruct an additional approximately 5,050 tonnes of PCBs over a period of eight years. Taking into account that the market price of PCB disposal for customer in Slovakia is between US$ 2,400 to US$ 2,800 per tonne, on average, the incineration of 7,550 tonnes of PCB wastes would cost between

US$ 18.12 million and US$ 21.14 million. The project would be cost-efficient and competitive and shows sustainability in longer term.

The U.S. put also forward the following questions: "If the non-combustion technologies are already commercialised, as is claimed in the background documents, why are they being demonstrated? Wouldn't it be cheaper to simply visit existing sites?" These questions are highly relevant, but it needs to take into account knowing that:

1. High level technical meetings were organised by the project proponents, including a STAP meeting, and inviting technology vendors and owners, but private companies did not open up and gave away validated monitoring data such as destruction efficiencies of the processes they operate commercially nor data on achievements reached in reduction of POPs chemicals releases. Claims range from confidentiality to legal commitments and reluctance of policy drive reacting to implementation of the Stockholm Convention requirements in their own countries.
2. The Government of Slovakia, UNDP and UNIDO, through the Technical Advisory Group (TAG) of the project have made five international technical meetings since March 2003, to collect information on these alternative technologies including site and field visits to Australia, Canada, Czech Republic and Mexico. The results obtained are reasonably good to allow project planning orientations but not sufficient to prepare a cost-effective calculation and a reasonable business plan that could positively be called as firm and solid. Basically, there are very few sites on commercial manner and it has proven impossible to extract proper data.
3. Individual consultants were contracted to set technical and commercial estimates of the present technology performance however without tangible success partly due to the commercial sensitivity prior to tender short listing but also intellectual property sensitive information such as for military use classified technologies.
4. Technical evaluation meetings held have partly attributed reasons of insufficient information to the site-specific character of the PCB waste matrices that would require different operations costing and expenses vary substantially even with the same technology due to the quality and the quantity of PCBs in the waste and equipment.
5. Private companies avoid exposure to specialised NGOs and activists if the technologies that are commercially used are found to be operating at technical sub-standards or at less stringent levels of norms of releases to the environment. That would negatively affect the reputation of the brand and thereby its operations in future.

It was then recommended by all proponents to proceed with the plan of a demonstration project to verify both technical and commercial parameters and at a reasonable capacity to allow destruction of the PCBs wastes and sediments in the recipient country as well as receiving wastes from other countries since Slovakia is now an EU country abiding by EU policies and regulations in this domain.

The U.S. commented, "the project document should refrain from attempting to interpret the Convention. This occurs in several places, including page 10 para 17 where it appears to be saying the Convention 'favors' destruction technologies that can minimize/eliminate POPs releases to all media. In fact, the Convention allows for treatment with technologies that don't achieve complete elimination." We take note and we have made the appropriate amendment of the cited paragraph in line with the Annex C, Part V. B. (b) of the Convention.

Finally, UNDP and UNIDO would like to give their assurances that based on the open and transparent tendering procedure an unbiased appraisal of the selected technology based on its technical and economic merits would be carried out and all the relevant technical, economic and financial documentation would be made available for all interested parties.

Comments by Germany of 3 December 2004

Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Successful Implementation of Available, Non-Combustion Technologies for Destroying POPs

The previous comments of Germany have been addressed. Confirmation of financial contributions has been given, changes have been made and clarifications have been provided as requested.

Because it is a prerequisite to one of the core activities of the project, and to complete the stakeholder commitments in the project documentation, we would like to see also a written confirmation from the Chemko Company that it agrees to cooperate in the project, provide space and allow the erection of the non-combustion facility at Chemko, and intent to forward its own 1,000 t PCB stockpile to the non-combustion facility for destruction.

With this additional written confirmation we support the implementation of the project as described in the revised version.

Recommendation: Taking into account above comments, Germany supports the proposal. Changes should be made during further planning steps and project.

Response to the comment of Germany of 3 December 2004

UNIDO appreciates the introductory statement of Germany that "The previous comments of Germany have been addressed. Confirmation of financial contributions has been given, changes have been made and clarifications have been provided as requested. "

For the specific comment related to the cooperation of Chemko Company with the project, UNIDO's response is as follows:

At an early stage of the project development Chemko was the only private partner that had been identified. Due to the unexpected changes in the Chemko's ownership and top management, as well as subsequent comments and demands by the GEF Council members, alternatives to exclusive cooperation and collaboration in this endeavor has been sought. Proposed design of the project is now combining the Chemko Company, which participate as a principal PCB wastes owner, and Ekoslužby Company, which will operate the non-combustion unit to be selected. More to this the Slovak Ministry of Environment guaranteed participation of other state and private PCB owners to participate in the project at the later stage.

To achieve sustainability and continuous, steady state operation of the demonstration plant, the location is in close vicinity to the stockpile owned by Chemko as well as other contaminated waste hotspots to facilitate transport, interim storage and disposal of all wastes and not exclusively restricted to Chemko wastes. The location of the site is being explored and eventually identified in close cooperation with the public consortium, particularly with the municipal authorities. In exploring this possibility the principal of private public partnership has been taken into consideration.

Notwithstanding of the above, the project will address the Chemko's PCB wastes of 1,000 tonnes and Chemko has confirmed in writing its commitment in this regards (see Annex 14).

Annex 2e: SUMMARY DRAFT REPORT OF STAP/GEF TECHNICAL WORKSHOP ON EMERGING INNOVATIVE TECHNOLOGIES FOR THE DESTRUCTION AND DECONTAMINATION OF OBSOLETE POPS, 1-3 OCTOBER 2003, WASHINGTON DC, USA

Summary draft report of the POPs workshop on non-combustion technologies for the destruction of POPs stockpiles

The Scientific and Technical Advisory Panel (STAP) was requested by the GEF to provide strategic advice on emerging, innovative technologies for the destruction and decontamination of POPs. In response, STAP convened a technical workshop in Washington D.C from 1-3 October, 2003, bringing together a group of experts from developed and developing countries, academia, research, international and government agencies, as well as representatives of the GEF Secretariat and the Implementing Agencies. The workshop was also attended by representatives from the Stockholm and Basel Convention Secretariats, and by UNIDO and FAO.

As a technical background document and basis for discussion, STAP commissioned a review of alternative technologies (with the University of Auckland, New Zealand), to provide a state-of-the art overview of existing and emerging, innovative and potentially cost-effective non-combustion and bio-remediation POPs destruction technologies. The review was also to examine the potential use of these technologies, taking into account the conditions prevailing in developing countries and countries with economies in transition, as well as regional differences, with the view to identifying promising technologies. The review was supplemented several country case studies in which the stockpile situation was analysed and different disposal options described and explored.

The specific aims of the workshop were to:

1. to review the technical review paper;
2. to examine the use and adequacy of alternative technologies in the context of the existing stockpiles, and taking into account the conditions prevailing in developing countries;
3. to examine the questions surrounding technology selection,
4. to identify non-combustion technologies that could contribute to the destruction of obsolete POPs stockpiles; and
5. to explore barriers to the use of emerging technologies, and the need for technology transfer.

In addition to plenary sessions, working group sessions were convened to consider in greater detail the substantive issues arising from the background paper and the plenary presentations and discussions, with the view to making specific recommendations to the GEF.

The first day of the workshop provided the context for the discussion on technologies, in terms of the Conventions, and the reality of existing stockpile situations. From the presentations by FAO, the Basel Convention, and the country presentations, it became apparent that stockpiles in developing countries are characterised by high diversity, complexity, and unknowns. Each stockpile is unique, and site contamination varies considerably. Overall the capabilities to handle stockpiles and site contamination are low or non-existing.

Given the excess capacity for safe stockpile destruction existing in the North, the most obvious short-term solution is to pack and ship the toxic waste. Total package systems are in place in Europe and other regions, and it is therefore sensible to remove stockpiles that are a one-time problem. However, on a longer-term scale, a number of issues need to be considered. The sustainability of the packing and shipping approach is questionable, particularly in light of rapidly changing conditions in developed countries, e.g. laws & regulation and public pressure. Furthermore, the question of contaminated soils remains, and so the issue of other "POPs" and pesticide waste. It is therefore reasonable to explore environmentally sustainable alternatives for developing countries. In considering alternatives, one should be aware of the very few

experiences and unclear priorities in developing countries, as well as the lack of support systems. In addition the standards for non-combustion technologies and the on-going innovation have to be considered.

The second day focused on the destruction technologies, namely the state of the art of alternative and incineration technologies, their applicability, and the criteria for selecting technologies. From there, the workshop looked at technology selection, taking into account the conditions in developing countries, and identified necessary conditions and requirements to deploy non-combustion technologies.

Key issues arising from the technology review were as follows:

- Developed countries tend to support incineration with the exception of Australia, which has almost completely destroyed its stockpiles.
- Major funding has not been provided to support or subsidise research into innovative non-combustion destruction technologies for managing stockpiles.
- The development of an innovative technology requires significant funding for (1) the development and testing of the technology on pure stocks, (2) initiating pilot stage and obtain venture capital funding and (3) ensuring support for any company willing to develop such a technology on a commercial scale. State support and subsidies provided to incineration to establish those facilities and ensure their commercial viability has to recognise when considering the support of new technologies. The costs of innovative technology development are high, at $0.5 – 1M for delivering proof of concept, $5 M for construction of a pilot plant, and $10-100M in ventures capital for a full-scale plant.

It was also noted that a technology is likely to be only suitable for a limited range of contamination levels and types of chemicals. Therefore, countries must be cautious in deciding to embrace a new innovative technology or group of technologies, and be sure that it is applicable for existing stockpiles and meets future waste destruction requirements.

The NATO categories used in the technical background document were reviewed and revised according to five categories, and technologies placed in them (A. Existing technology with considerable experience B. Near or at the start of commercialisation C. Promising technologies D. Significant research required and E. Not likely to be applicable), and one “parking lot” category (non-classifiable, due to insufficient information). Technologies for which there is limited evidence of laboratory research (e.g. one or two published papers) were placed in an appendix.

The meeting agreed on a working definition of “non-combustion”, namely processes that take place in a starved or ambient O2 atmosphere. This definition therefore includes gasification and plasma arc technologies such as PlasCon, placed in category A. The details about the technologies and categories can be found in the report of the workshop and the annex.

With regard to timelines for new technology development, they are 3-4 years for research to pilot scale, another 3-4 years for pilot scale to near commercialisation, and 5-7 years for near commercialisation to commercialisation. Scale up problems includes a range of technical issues (example: higher demands on materials), efficiency losses, mixing problems, by-products reduction etcetera. The start-up and shutdown processes can give major problems, and the robustness of the process (not sensitive to minor changes) can be uncertain.

The workshop also considered issues surrounding the selection of technologies both at the site and systemic level. The details of this will be included in the full report of the workshop. The development of an interactive expert system with multi-attribute analysis was proposed. The University of Auckland will to come with specifications for the system. The system would need to be constantly updated and open-ended, in that as new technologies came available they can be uploaded onto the system.

Furthermore, in-situ bio and phytoremediation were discussed. The conclusion was that these technologies have great potential and there are many documented examples of success with low-level PCBs and POPs. Further testing and development of appropriate technologies will be important because of the ban to export to the EU.

Finally, the workshop considered the broader issue of GEF's role and barriers to the use of non-combustion technologies in stockpile and site cleanup, and discussed the elements of a GEF strategy. The main recommendations to the GEF are as follows:

1. Criteria are to be developed for supporting non-combustion technologies (in terms of risks, priorities/country-drivenness, sustainability, finance, enabling environment, partnerships).
2. It is likely that such criteria are met in countries like East and Central Europe, Mexico, Philippines and China (this is indicative, not an exhaustive list).
3. The GEF needs to consider how it can support a technology in an uneven playing field (the difficulty with OP# 7 was referred to), and how much it is willing to spend on a technology. Given the high cost and timelines of 5 to 7 years to bring a near-commercial technology to fully commercial, the GEF needs to consider the advantage of supporting technologies other than those in category A.
4. If the criteria are not met, the GEF should support packing and shipping the stockpiles (as in the ASP program). In the ASP program stockpiles will be removed over a period of 15 years (53 countries); the African market is small, and the GEF policy should be investment in soil remediation.
5. Where capacities are low, and the soil contamination a danger to public health, soil cleanup and rehabilitation should be funded (for example in most of Africa), using bio and phytoremediation technologies. In this regard a science program using twinning and peer review for bio and phytoremediation technologies was suggested.
6. The establishment of a clearing-house for available technology information.

December 7, 2003

Annex 3: DUTY STATEMENTS

The Terms of Reference for staff and their lines of management/reporting responsibilities will be finalized during the course of project implementation, based on the duties and responsibilities listed below.

1. PROGRAMME COORDINATOR

Background

The Programme Coordinator (PC) will be responsible for the overall management and co-ordination of project activities, liaising with government, UNDP, UNIDO and NGOs, and maintaining tight links with all project partners providing co-financing for the GEF Alternative. The PC will have dual reporting responsibilities, reporting to UNIDO and the UNDP Resident Representatives in the host countries through the respective Programme Officer.

Duties and Responsibilities

1. Supervise and co-ordinate the production of project outputs as per the project document;
2. Keep abreast of developments in non-combustion technologies worldwide and specifically the Stockholm Convention;
3. Mobilize project inputs in accordance with UNDP/UNIDO procedures;
4. Oversee finalization of Terms of Reference for Project Staff, Consultants, and sub contracts;
5. Supervise and co-ordinate the work of all project staff, including national and international consultants;
6. Prepare and revise project work plans, and financial plans as required from time to time;
7. Assure dissemination of project reports and assure that *ad hoc* queries from concerned stakeholders are addressed;
8. Liaise with the UNDP Country Offices, government and all project partners, including donor bodies and NGO's to ensure effective co-ordination of all project activities;
9. Oversee and ensure timely submission of quarterly financial reports, quarterly progress reports and the Annual Project Reports;
10. Involvement of the Basel Convention, UNEP Chemicals, FAO, WB-IFC will be sought and to create an effective framework for their active participation;
11. Represent the project on the PAC, PSC and TAG and ensure follow-through on directives issued by the PSC.
12. Ensure continuing development of the Project demonstration activities in the remaining two countries, including development and finalization of Project Briefs, that will be required for Council submission;
13. Provide coordination between and among the four demonstration Projects comprising the overall Non-combustion Programme;
14. Ensure effective communication between and among the Non-combustion Demonstration Project, and *inter alia,* other Stockholm Convention related Projects and activities such as the Africa Stockpiles Programme (ASP), the UNEP Implemented and UNIDO Executed NGO Capacity Building MSP, and Enabling Activities in Central and Eastern Europe and globally;
15. Plan at least two (2) meetings of the Programme Advisory Committee (PAC), three (3) meetings of the Project Steering Committee (PSC), and three (3) meetings of the Programme and Project Technical Advisory Group (TAG).
16. Be responsible for the organization and implementation of four (4) Regional Workshops (Latin America/Caribbean, Africa, Asia and Arab States) to disseminate information/results on Non-combustion technologies and destruction activities to date and project lessons learned.

Selection Criteria

1. Post-graduate degree in chemistry, chemical engineering, environmental sciences, management or related field with at least 15 years professional experience in POPs related work;
2. Ability to effectively co-ordinate a large, technologically and managerially complex programme;
3. Demonstrated ability to effectively interact with a large number of affected Stakeholders and the NGO community;
4. Experience in matters related to the Stockholm Convention and the preparation of GEF Projects;
5. Knowledge of Non-combustion POPs destruction technologies;
6. Fluency in the English language and excellent written and oral communications.

2. NATIONAL PROJECT DIRECTOR

Background

The National Project Director will be responsible for the country level management and co-ordination of project activities, liaising with government, UNDP, UNIDO and NGOs, public and private sector consortia, technology vendors for the destruction unit and soil extraction unit. The NPD will report to UNIDO and the PC.

Duties and responsibilities

1. Oversee the day-to-day operations of the first Non-combustion Demonstration Project in the Slovak Republic and, overall, be responsible for its effective implementation and ensure adherence to the approved work plan;
2. Assure effective coordination between and among the Implementing and Executing Agencies, the Government of the Slovak Republic, the vendor, the private sector entity responsible for the day-to-day destruction operations of the 2,500 tonnes targeted stockpile and related soil/sediment clean-up, and Civil Society;
3. Supervise the activities of the public and private sector consortia established for project implementation;
4. Facilitate issuance of licensing and permitting authorization for operating the destruction unit in Slovakia;
5. Assist with clearance and forwarding of project equipment;
6. Monitor and report on the implementation of the business plan as undertaken by the private sector consortium;
7. Assure the requisite level of on and off-site training for all personnel related to the Project;
8. Organise meetings of the PSC and prepare reports of the meetings for distribution to all stakeholders;
9. Ensure that the requisite level of monitoring and evaluation of project results is undertaken and properly disseminated; and
10. Serve as the principal and day-to-day link to the Programme component.

Selection criteria

1. Post-graduate degree in chemistry, chemical engineering, environmental sciences or related field with at least 10 years professional experience;
2. Knowledge of the POPs situation in the Slovak Republic generally and in the project area specifically;
3. Knowledge of non-combustion POPs destruction technologies;

4. Experience in large scale project management;
5. Fluency in Slovak language and English.

3. ASSOCIATE EXPERT on NON-COMBUSTION TECHNOLOGIES

Background

The Associate Expert (AE) will be responsible for day-to-day project activities as well as participating in the assembly, testing, and commissioning of the non-combustion unit and the soil extraction unit. The AE will also participate in the training programmes organized for project personnel in Slovakia. The AE will report to UNIDO.

Duties and responsibilities

1. Participate and provide inputs for the preparation of detailed tender documents for the supply of project equipment;
2. Participate in the technical evaluation of the bids submitted by vendors;
3. Monitor assembly, testing and commissioning of destruction and soil extraction units and ensure technical compliance with bid documents, submit technical reports on the assembly, testing and commissioning operations;
4. Participate as technical resource person in meetings of the PAC, TAG and PSC as well as regional workshops;
5. Participate as a resource person in training programmes organized in Slovakia for project personnel;
6. Review reports prepared by international and national consultants/experts.
7. Design and maintain the programme and project website.

Selection criteria

1. Postgraduate degree in chemistry, engineering or environmental sciences with at least 3 years work experience.
2. Specific academic and/or professional experience and expertise in the development and application of non-combustion destruction technologies.
3. Advanced computer skills including website design, Word, Excel.
4. Fluency in English (written and spoken) including ability to prepare technical reports.

4. NGO POPS SPECIALIST

Background

The NGO POPs Specialist will be the link person with the NGO community working in close collaboration with the Environmental Health Fund. The main responsibility of the NGO Specialist is to ensure continued civil society participation in all aspects of the programme and project including performance monitoring and evaluation.

Duties and Responsibilities

1. Observe and report upon, as the technical resource person the assembly, testing and commissioning of the destruction and soil extraction units;
2. Participate in environmental monitoring of the destruction unit and evaluation of the project.

3. Organise Civil Society meetings in Slovakia and regionally to disseminate project implementation reports including evaluation of the performance of the selected non-combustion technology.
4. Participate in meetings of the TAG.

Selection criteria

1. Postgraduate qualification in environmental sciences or engineering
2. Strong association with the NGO community
3. Knowledge of non-combustion POPs destruction technologies
4. Fluency in English, with Slovak speaking ability considered an important plus.

5. POPS DESTRUCTION CONSULTANTS

Background

The POPs Destruction Consultants will be the key technical experts on POPs non-combustion destruction technologies. The consultants are expected to have in-depth knowledge and experience on various emerging non-combustion destruction technologies, particularly those reviewed by the TAG and the STAP. The POPs Destruction consultants will work under the supervision of the PC.

Duties and Responsibilities

1. Undertake detailed technical evaluation of the performance of the non-combustion POPs destruction technology and prepare technical reports for presentation to TAG, the Stockholm Convention COP, STAP and regional meetings.
2. Assist in carrying out technical evaluation of the bids received from technology vendors and prepare an evaluation report for presentation to UNIDO through the PC.

Selection criteria

1. Postgraduate qualification, preferably at the PhD level in chemistry, chemical engineering, environmental science or related field. At least 10 years working experience.
2. Knowledge of POPs especially PCBs and their impact on health and environment.
3. Knowledge of the Stockholm Convention.
4. In-depth knowledge of state of the art of non-combustion POPs destruction technologies including major vendors.
5. Fluency in English

6. NATIONAL EXPERT FOR ENVIRONMENTAL MONITORING

Background

The National Expert for Environmental Monitoring will be responsible to monitor environmental compliance of the facility in accordance with existing regulations in Slovakia. The expert will specifically carry out technical measurements of unintended POPs, in a variety of media that may be generated by the destruction facility on a regular basis throughout the demonstration phase of the project.

Duties and responsibilities

1. Carry out technical measurements of possible unintended production of POPs from the destruction facility at least once every month throughout the period of trial operation. Samples take from the facility to be analysed in an appropriately equipped chemical analysis laboratory in Slovakia.
2. Prepare quarterly reports of the possible releases of dioxins and furans from the destruction facility and present results at meetings of the PAC, PSC, TAG, NGOs and regional workshops.

Selection criteria

1. Post graduate qualification preferably at the PhD level in chemistry or environmental sciences. Access to EU accredited laboratory for chemical analysis of dioxins and furans.
2. Evidence of previous work experience in measurement of dioxins and furans.
3. Knowledge of technical report writing in English.

Annex 4: TERMS OF REFERENCE OF SUBCONTRACTORS

Substantive Terms of Reference for provision of Non-Combustion Unit and Services required to destroy Persistent Organic Pollutants (POPs) and more specifically PCBs in different matrices in Slovakia

Preface

For the selection of a non-combustion technology to destroy PCB-containing wastes and PCB-containing equipment in Slovakia a two tiered (technical and financial) international tendering process will be carried out within the framework of this project. The international tendering will be carried out strictly in line with the UNIDO Financial Rules and Regulations and the UNIDO Procurement Manual. The bids will be requested to submit to UNIDO through a two-envelope system. The TAG members will evaluate the first envelope including the technical offers. The TAG will assume the responsibility of assessing whether or not a particular proposal meets established project criteria detailed in the Terms of Reference of Subcontractors that is the subject of this Annex. The TAG report would then be submitted to the Committee on Contracts of UNIDO. The Committee on Contracts will evaluate the second envelope containing the financial offer. The Committee of Contracts will select the least expensive technically acceptable bid.

Background information

A commercially available non-combustion technology should be transferred to the Republic of Slovakia under the framework of the GEF-UNDP-UNIDO Global Programme to Demonstrate the Viability and Removal of Barriers that Impede the Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying POPs. It will be used for the purpose of destroying PCB stockpiles and other POPs stockpiles and wastes in Slovakia.

In order to assist in the identification of such technologies the Scientific and Technical Advisory Panel (STAP) was requested by the GEF to provide strategic advice on emerging, innovative technologies for the destruction and decontamination of POPs. In response, STAP convened a technical workshop in Washington D.C from 1-3 October, 2003, bringing together a group of experts from developed and developing countries, academia, research, international and government agencies, as well as representatives of the GEF Secretariat and the Implementing Agencies. The Stockholm and Basel Convention Secretariats, UNIDO and FAO also participated. The STAP workshop fully confirmed the findings and decisions of the Project Technical Advisory Group (TAG) made since 2001 during the preparatory phase of this project. As a follow-up to the STAP workshop, a review of non-combustion technologies has been commissioned that can be used to further identify and select appropriate technologies for the destruction of specific stockpiles and wastes entrapped in particular matrices.

The project site will be situated in the area of Chemko Company in Strazske and Ekosluzby Company will operate the destruction unit.

A description of the targeted stockpile is depicted in Chart 1 on Page 44 of the Project Document. This stockpile and further amounts of identified and collected POPs chemicals in different matrices will be shipped to the project site and destroyed by a chemical non-combustion technology to demonstrate the technical, economic and financial viability of the technology.

The first requirement for a POPs disposal technology under this project is a destruction efficiency (DE) greater than 99.9999 percent or “6-9s”. DE is defined as the total mass of a chemical into a process, minus the mass of the chemical in all products, by-products and environmental releases, divided by the input mass (to give a percentage). This differs significantly from the other common measure, destruction and removal

efficiency (DRE), which only takes into account stack emissions, with no regard for other releases and residues. Only closed processes that achieve greater than 99.9999 percent DE can be considered. Any technology to be used must be inherently safe.

Technology options

The project TAG reviewed available information on commercially available, appropriate non-combustion technologies at its first and second meetings held in October 2001 and September 2003 respectively. The reports of these meetings are presented in Annexes 9 and 9A.

The STAP technical workshop held in Washington D.C. in October 2003 also reviewed non-combustion technologies. The STAP Review of Emerging, Innovative Technologies for the Destruction and Decontamination of POPs and the Identification of Promising Technologies for Use in Developing Countries and Countries with Economies in Transition on the STAP website at (http://stapgef.unep.org) used five categories in its review of technologies, as follows:

1. Direct applicable technologies with considerable experience,
2. Applicable technologies on the stage of a 'breaking through and/or the start of commercialization,
3. Technologies that given the right financial circumstances could be full scale within approximately five years,
4. Technologies in the stage of laboratory scale testing, and
5. Technologies, which are unlikely to be applicable for destruction of POPs stockpiles.

The project TAG had agreed that the project should only consider the deployment of technologies that are in category 1: direct applicable technologies with considerable experience. In addition, the TAG rejected technologies such as pyrolysis and plasma for deployment in this project based on the TAG's consideration and application of the technology selection criteria that are detailed in the approved Project PDF-B Document.

It should be noted that for this Contract, not only the STAP criteria, but also the more stringent Project criteria should be applied. Any technology selected must be capable of performing to the standards described in both STAP and Project criteria agreed upon by the TAG meetings.

Occupational safety

The TAG in its first and second meetings agreed that any technology to be selected and used had to be demonstrably safe.

In order to achieve the highest possible level of occupational safety during the destruction of POPs, an interpretation of the project's criteria was introduced for use in the identification and selection of technologies to be applied. The project's criteria already specified that the technology should operate in an essentially closed system. This was interpreted to apply, not only to the selected technology's main reactor vessel or chamber, but to apply to the totality of the destruction system including required pre-treatment operations. The initial hazardous substances to be destroyed, as well as any by-products that might be generated during the chemical processing shall be kept in this closed system and recycled and/or destroyed.

Project description

The project includes:

1. The design, construction and test operation of purchased equipment, to be performed in Slovakia or at the vendor's site (depending on costs and other circumstances), taking fully into account the

known stockpiles and wastes to be destroyed, the matrices in which they are known to be contained, and all project performance and specifications requirements;

2. The deployment, construction and certification of an operating destruction unit (commissioning) at the project site;
3. Training of project personnel;
4. Provision of facility equipment (utilities) directly linked to the destruction unit (systematization); and
5. Monitoring and evaluation of the process during destruction of POPs and other wastes during project implementation.

Special considerations

The STAP Review gives special considerations to the application of non-combustion technologies in developing countries and countries with economies in transition. The technologies used in this project for destroying POPs stockpiles and wastes must meet the following fundamental performance criteria:

1. Destruction efficiencies (DE) should be virtually 100 percent, and shall be at least 99.9999 percent for the chemicals concerned. The determination of virtually 100 percent destruction efficiency is necessarily based on findings of extremely low concentrations of the chemicals of concern, approaching zero in all releases (waste streams, residues, possible leaks) using the most sensitive analytical techniques available worldwide. However, "zero" releases are a difficult concept because it relates as much to the sensitivity of monitoring and measuring technology as to the destruction technology. All that can ever be claimed or proven is "*not detected at a particular level of calibration for the method employed*". Therefore, it is appropriate to set a standard that can be enforced with known or expected analytic methods. Six nines is a standard that has traditionally been used for air emissions associated with POPs destruction. It will be applied in this project as a required destruction efficiency (DE) taking into account releases not just to air, but also to all media. Analyses of releases to all media must be carried out with a frequency sufficient to ensure compliance with this criterion during start-ups, shutdowns and routine operations.

2. In order to better attain the above mentioned goal and also to best satisfy the technology selection criteria specified in the project PDF-B document, the selected technology should operate in an essentially closed system. It should preferentially incorporate the capacity to monitor all process residues and out-flowing stream and, if necessary, to redirect these streams for reprocessing if this is needed to ensure that no chemicals of concern or other harmful compounds, such as newly formed POPs or other hazardous substances, are released to the environment. Technologies, which may require uncontrolled releases (e.g. relief valve from high-pressure vessels) or environmental spreading of POPs, even at hardly detectable levels should carefully be scrutinized and preferably avoided.

Every vendor preparing an offer for equipment supply and services to this project shall submit verified data, based on the commercial operation of the same or essentially similar technology that includes characterization and analysis of process residues, including all streams of all solid, liquid and gaseous residues. The vendor should also provide information on the technology's commercial operating history including information on when and how frequently "upset" conditions have occurred (times when the facility operations deviated from the parameters of normal operating conditions), and data on possible releases that might have occurred during such "upset" conditions.

Determining the extent to which a technology meets these project criteria during both preliminary tests and routine operations depends on a variety of factors including, but not limited, to:

- scientific and engineering expertise;
- historical information on previous commercial operations including measured releases during normal operations, and occurrences of "upset" conditions and their consequences;

- equipment and facilities for sampling and analysis of the materials to be destroyed and all releases and residues of the destruction process;
- stringent operating guidelines; and
- comprehensive regulatory framework, including enforcement and monitoring requirements.

In developing countries and countries with economies in transition the transfer and application of non-combustion technologies requires additional considerations, as follows:

A. When on site destruction technologies are applied, special considerations should be given to:
   - Complexity of the conditions and situation of the site and stockpile;
   - Hazards of incomplete removal and destruction;
   - Environmentally sound management;
   - Implication of transfer of a single technology;
   - Characteristics of stockpile sites;
   - Logistics of application of non-combustion technology;
   - Comparative criteria.

B. Adaptation of non-combustion technology:
   - Performance;
   - Costs;
   - Input wastes.

C. Adaptation of project site to the technology:
   - Resource needs;
   - Costs;
   - Environmental impact;
   - Industrial and occupational hazards;
   - Constructability;
   - Output Waste;
   - Type and quality of matrices;
   - Capacity building needs.

Scope of vendor's supply and technical services

The vendor should prepare its offer for equipment supply and services taking into account the considerations described above.

a. The nominal capacity of the destruction unit should be 1000 tonnes per year. The offer should give all relevant technical details of this documentation with system specifications and detailed costs break down of all major equipment groups as well as delivery time frames. All technological, civil and mechanical/electrical engineering designs and drawings of equipment and systems to be installed including standard operating procedures (SOPs) should be prepared for the destruction unit.

b. In order to be able to carry out a comparative analysis of the different offers received, the vendor should provide DE and DRE values of the technology offered for each type of matrices of the project stockpile. In addition the costs of operation and other relevant parameters of the pre-treatment and the destruction phases should also be given for each type of matrices of the stockpile of the project.

c. The vendor should give its labour costs for preparing the technical documentation of the equipment. This documentation should include, *inter alia*, process flow diagrams (PFDs), pipe and instruments diagrams (P&Ids) with equipment specifications, general arrangement drawings, sub-assembly drawings and detailed drawings. The time for each drawing and related engineering work should be estimated and given in hours.

d. The vendor should prepare a detailed costs breakdown of manufacturing the equipment for each major equipment group with time frames.

e. The vendor should prepare a detailed costs breakdown of testing the equipment on site or at the vendor's site with time frames.

f. The vendor should prepare a detailed costs breakdown of deployment, reconstruction and certification of operations (commissioning) of the destruction unit at the project site with time frames.

g. The vendor should prepare a detailed calculation of the operating expenses, separately for each matrix.

h. The vendor should prepare a detailed training programme for the managerial/supervising, operating and technical personnel in Slovakia and carry out this programme. The costs and time frames of the training programme should be given.

i. The vendor should provide facility specifications for installing the destruction unit at the project site.

j. The vendor should prepare a detailed costs break-down of providing the facility equipment (utilities) directly linked to the destruction unit (systematisation) with time frames as well as the costs of engineering support at the project site.

k. The vendor should provide operating and maintenance instructions and manuals.

l. The vendor should give the costs and time frames for monitoring and evaluation of the process during POPs destruction.

m. The costs given by the vendor should be within the budgetary allocations of the project.

n. The time frames given by the vendor should be in line with the work plan of the project as presented in Annex 5 of the project document.

o. The vendor should prepare licensing agreement with the operating entity.

p. The vendor is responsible for freight to the Slovak border after which the Slovak parties will take over, arrange taxes, etc.

q. The vendor should provide spares and parts of the major equipment groups of the destruction unit as appropriate to ensure the un-interrupted operation during the demonstration phase of two years.

r. The vendor should provide troubleshooting visits to the project site, if needed, during the demonstration phase.

s. The vendor's representative, if invited, should participate in TAG meetings of the project.

t. The vendor should respond to inquiries of the public and private consortia and its representative, if invited, should attend the meetings of the public and private consortia.

u. The vendor's representative should attend all five (5) regional workshops organized for Africa, Arab States, Asia and the Pacific, CEE and Latin America and the Caribbean as a faculty and resource person.

v. Vendor's liability will be limited to the Capital amount. There should also be a distinction between the technical providers liability and operator's liability.

w. The vendors are required to submit verified data on the characterization and analysis of process residues including all streams of all solid, liquid and gaseous residues and they should provide information on their commercial operating histories including information on when and how frequently "upset" conditions have occurred (times when the facility operations deviated from the parameters of normal operating conditions) and data on possible releases that might have occurred during such "upset" conditions.

Licensing agreement

The licensing agreement should consider, *inter alia*,

1. Terms and condition for the license (geographical coverage and type of waste);
2. Ownership of the technology during the demonstration phase;
3. Ownership of the technology after the demonstration;
4. Royalty fee after the demonstration phase; and
5. Modalities and transaction costs for transferring the license in case of deployment of the technology to a third party.

The licensing agreement should be made between the operating entity and the vendor. The license will cover the Slovak Republic and it would cover only PCBs and other chlorinated toxic compounds.

The issue of the ownership of the plant after the demonstration phase has to be agreed upon. In case the operating entity would be owner, the plant would operate at a commercial scale, a royalty fee should be agreed upon and paid by the operating entity.

If the technology would be deployed to another country in the CEE region, the license could be transferred to the new operator/owner. Transaction modalities and costs for the license should be defined in the contract with the vendor within the frame of the GEF-funded global programme executed by UNIDO.

Terms of guarantee

The vendor should apply the best practice in destroying the POPs stockpiles. Its mechanical, electrical performance and safety guarantee as well as the technology introduced should be in accordance with the international practice and standards.

The vendor should provide a minimum two-year of operations guarantee that parameters related to the performance of high quality are met during the commissioning and trial runs/start up. The operator should guarantee the same after the start up.

The vendor guarantees the quality of all the work specified in the above.

The vendor should guarantee that the equipment to be supplied will be new, of recent reception, without any defectiveness or incorrect operation, and that the time for the technical guarantee will be 24 months starting from the date of the acceptance certificate.

The vendor's responsibility shall be valid until the expiry of the guarantee period. The vendor is required to intervene and rectify each operating defect, defectiveness or irregularity that are due to misuse of equipment, accidents, negligence of standard operating procedures (SOPs), faulty reinstallation or any damages, as well as the ones caused by imperfect manufacturing or material faults of the equipment. Anything beyond Vendor's guarantee will be at cost.

The vendor guarantees that its supply and services will be provided in the agreed quantities and quality and according to the international standards within the agreed time frames and contract costs. The prerequisite for this, however, is that the operating entity fulfils in full measure its responsibility in line with the time frames of the project.

Furthermore, the vendor has to inform UNIDO as well as the other parties of the project, if equipment, work, components and materials supplied under the responsibility of the operating entity do not fulfil the safety standards or if the training of the staff did not reach the standards required for the safe operation of the destruction unit.

Reporting

The vendor will have a reporting responsibility to UNIDO according to the schedule to be given in the contract document. The quality and quantity as well as the schedule of reporting will also be described in the contract document in detail.

SUBSTANTIVE TERMS OF REFERENCE FOR PROVISION OF SOIL DESORPTION UNIT AND SERVICES REQUIRED TO DESTROY PERSISTENT ORGANIC POLLUTANTS (POPS) AND MORE SPECIFICALLY PCBS IN SOILS AND SEDIMENTS

Background information

Under the framework of the Global Programme to Demonstrate the Viability and Removal of Barriers that Impede the Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying POPs, and more specifically the PCBs stockpiles in Slovakia a commercially available soil desorption technology should be transferred in conjunction with an newly established non-combustion PCBs destruction unit to the Republic of Slovakia.

The soil desorption technology, like the PCBs destruction technology should be a closed technology that implies the containment of all residues and releases for monitoring and, if necessary, reprocessing.

Since the soil desorption unit should be operated as an integrated part of the whole destruction process the Substantive Terms of Reference for this contract can be prepared only after the selection will be made for the destruction technology. However, the procurement of this technology will be carried out though the same selection process as described in the Preface of this Annex.

Annex 4a: Agreement on Technology Selection and Terms of Reference

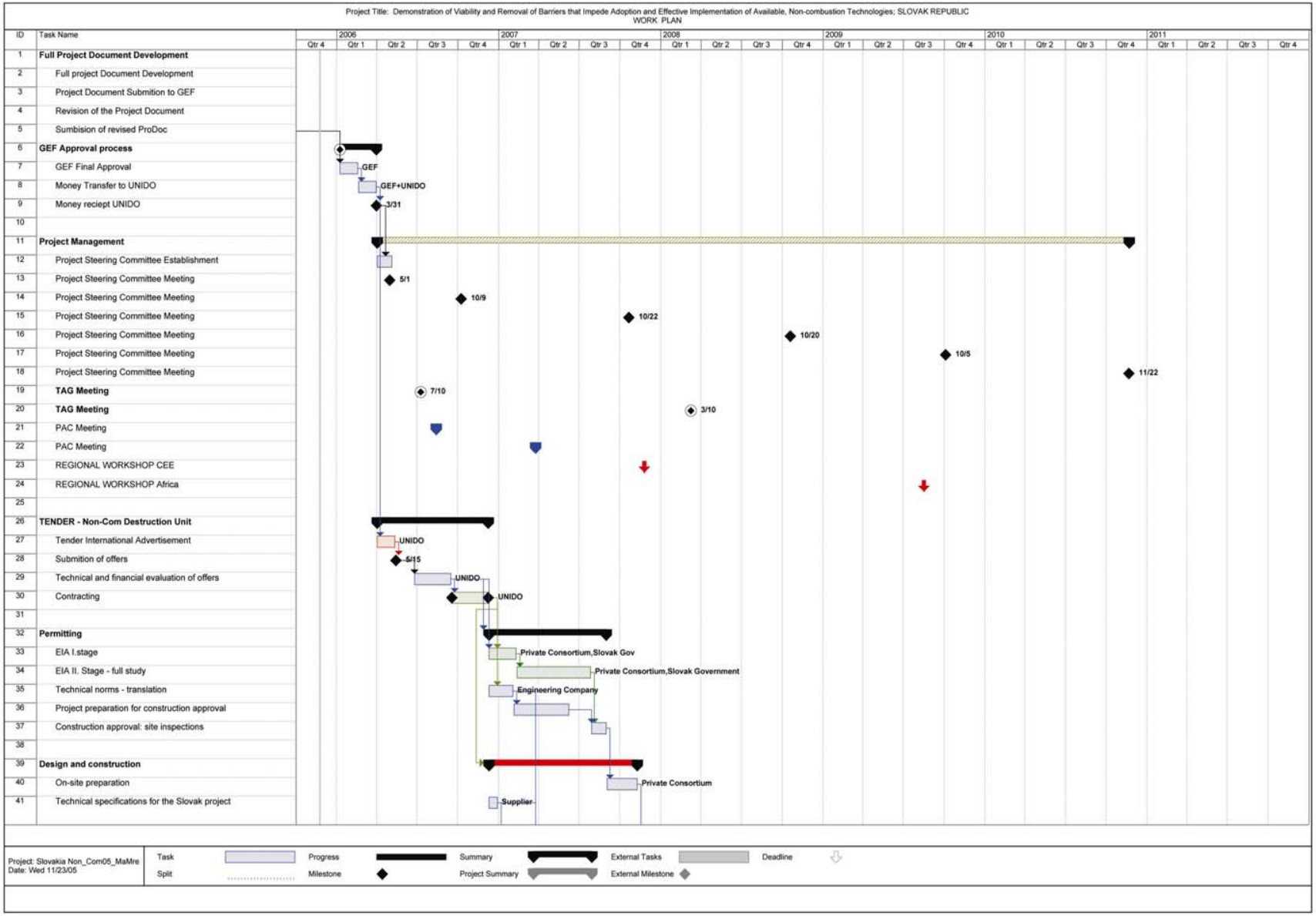
During the Project finalization, the Slovak Ministry of Environment expressed the view that details for the technology selection and Terms of Reference should be discussed and agreed on the Steering Committee Meeting prior the selection and tendering process will take place, taking into account newest development in the area, state of the art in the non-combustion technologies and all relevant aspects, which will allow to adequately and transparently manage technology selection.

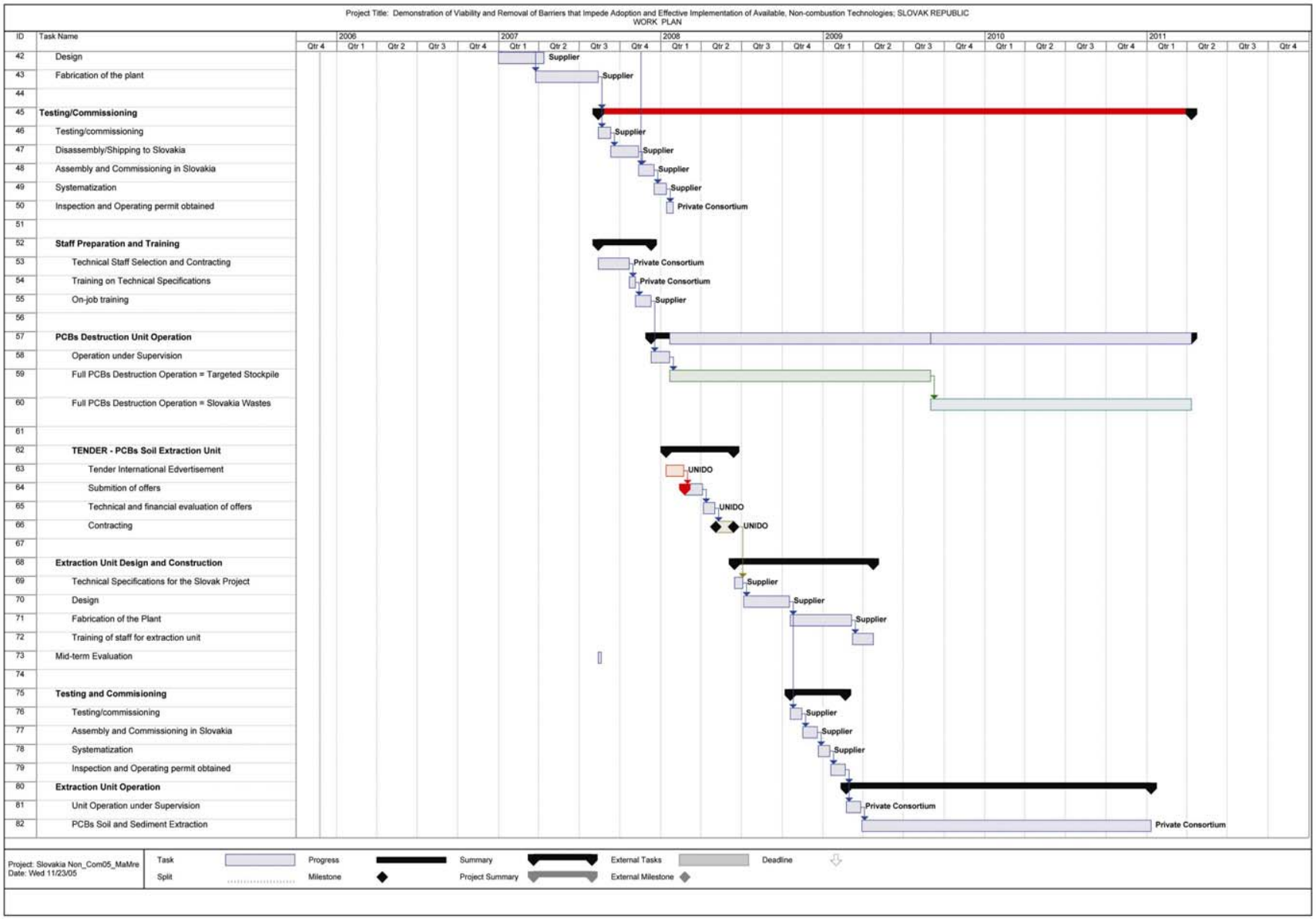
6.4.2005 in Ivanka pri Dunaji

Martin Murín, MSc.
UNIDO consultant

Upravené Kata Novaková, SZP ZEÚ MŽP SR, 7.4.2005

Annex 5: WORK PLAN




Project Title: Demonstration of Viability and Removal of Barriers that Impede Adoption and Effective Implementation of Available, Non-combustion Technologies; SLOVAK REPUBLIC
WORK PLAN
ID
Task Name
2006
2007
2008
2009
2010
2011
Qtr 4
Qtr 1
Qtr 2
Qtr 3
Qtr 4
42 Design
43 Fabrication of the plant
44
45 Testing/Commissioning
46 Testing/commissioning
47 Disassembly/Shipping to Slovakia
48 Assembly and Commissioning in Slovakia
49 Systematization
50 Inspection and Operating permit obtained
51
52 Staff Preparation and Training
53 Technical Staff Selection and Contracting
54 Training on Technical Specifications
55 On-job training
56
57 PCBs Destruction Unit Operation
58 Operation under Supervision
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Annex 5a: Business Plan

Financial and Economic Analysis of Destruction of POP's Wastes Using Non-combustion Technology in the Slovak Republic

1. Financial analysis

1.1 Description of methodology

A financial appraisal of the project has been based on the cash flow projection in order to calculate two main indicators: financial rate of return (FRR) and financial net present value (FNPV). FRR has been calculated specifically on investment (FRR/C) and on own capital (FRR/K), the same procedure has been done for FNPV. All calculations have been done under the assumption of certain set of financial conditions. The tables of financial analysis consist of financial flows required for the demonstration project, operating costs, revenues, sources of financing and cash flow analysis.

An important step of evaluation was to identify the value of revenues and costs to the operating entity and the other private partners as a result of the demonstration project. The main components were:

1. Funds required for the cost of acquiring the non-combustion technology (NC technology or NCT),
2. Costs for operating NC technology,
3. Waste collection (e.g. capacitors),
4. Revenues of the project depending on the price of waste destruction, and
5. Defining of financing structure of the project.

A model that has not taken into account the financial sources, was used in the first step of the financial evaluation. The FRR/C and FNPV/C were calculated using this assumption. As these values might not be attractive for investors in environmental projects, a modified method for determining the financial gap was used to calculate FRR/K and NPV/K. Although the value of grant in this project was already given, the financial structure was tested via acceptable results of FRR/K and NPV/K. The sustainability of the project was tested through the cash flow forecast as well as the affordability of the project for self-government in the region of East Slovakia, a member in the public consortium (PC).

From financial points of view two project activities have major importance:

1. NC technology, and
2. Soil/Sediment extraction technology (SSE technology)

SSE technology was not financially evaluated because the basic data for evaluation was not available at the time of evaluation. SSE technology was included in financial table only as part of the GEF grant . This technology would be used for PCB waste extraction from the contaminated soil/sediment. The process of waste extraction is financially independent from destruction of waste by NC technology and thus the financial evaluation is focused only on results NC technology operations, which is the main part covered by the GEF grant.

1.2 Assumptions

To build the analysis it was necessary to define basic set of attributes including:

- macroeconomic environment in general (exchange rate, inflation, etc.),
- financial status of beneficiary,
- economic life of the project,
- project costs (capital, operating, maintenance, financial and eligibility of costs), and
- project revenues.

1.2.1 Macroeconomic environment

The relevant macroeconomic environment (general parameters like wage growth in relation to growth of industrial outputs and productivity or standards of life) affects the project. This section provides some details on Slovakia's macroeconomic performance.

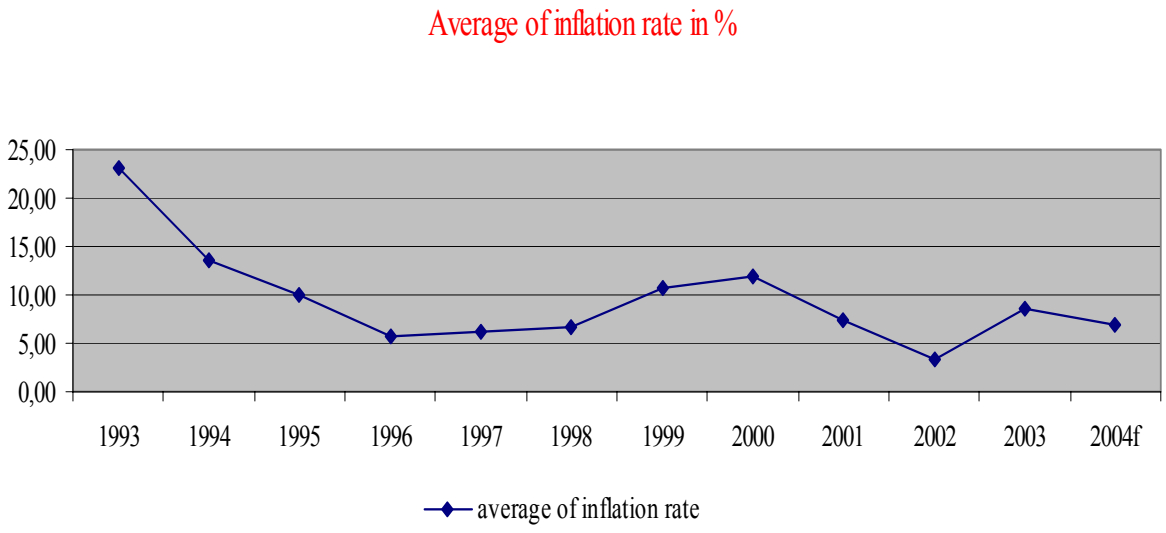
Economic growth

GDP growth which was over 6% per annum in the period 1995-97, dropped to 1,9% in 1999 but has again increased to 4% in 2002. According to the most recent reports of the National Bank of Slovakia, there is an assumption that annual growth rate of GDP till 2006 will be at the level of 4.6%. Macroeconomic imbalance in the past was also reflected by high interest rates, though the interest rates have declined markedly over the last few years. The National Bank of Slovakia on December 12th 2002 decided to use the base interest rate that is the rate for two weeks report tenders. This base interest rate has been 6.25% from September 25th 2003. The decrease of interest rate compared with previous years (8.8 – 12%) has led to lower pressure to businesses by decreasing financial costs.

Inflation

The development of inflation rate is shown in Fig.1. In the last 5 years the inflation rate in Slovakia has been relatively low. Its increase in 1999 was caused by the increase of regulated prices of electricity, gas, transport, heating and rent that peaked in July 2000. At the end of 2000 the inflation rate dropped below 10% where it stayed also during 2001 and 2002. On the other hand it must be said that experts expect higher increase of inflation rate within the next two years, in case the government will continue in structural changes and in deregulation of prices – for energies, gas, water, etc. These changes will bring higher inflation than it has been in the recent years.

Figure 1. Average inflation



The price increase of electricity, gas, water, transport as well as health and education and the increase of value added tax (VAT) in 2003 led to an increase of annual inflation to between 8 - 10%. This was already confirmed by the inflation rate in August 2003 that reached 9.2%. In 2004 new changes for VAT were implemented - increase to 19% of tax base. These changes together with the process of eliminating price regulation will keep the annual inflation higher than 7% in next 3 years and over 8% in 2008.

The price increase in construction industrial represented 18% cumulative within the last 3 years. The capital costs were set at fixed prices at the price level of 2003 in US$, which partly addressed the problem of inflation.

In the financial calculations of the project a factor for relative price increase was applied to particular items of operating costs, such as wages, raw materials and energy.

Exchange rate

For financial risks it is important to consider the fluctuation of exchange rates between several currencies, but most importantly between US$ and Slovakian Krones.

Wages and employment

The growth of real wages mirrors the pattern of inflation. A significant decline of growth by 3.10% to 4.90% in 1999-2000 was caused by high inflation. In 2002, the increase of real wages representd 5.6%. Due to deregulation of prices, the real wages decreased in 2003 and 2004. In the future, it is expected that the previous high volatility will be replaced by a period of sustained economic growth.

Discount rate

All financial indicators in the financial and economic analysis are calculated at 6% discount rate in accordance with standards of EU banks for such projects.

Interest rate

The interest rate of commercial loans is in the range of 7-10%. The grace period is maximum 1 year and payback period is not longer than 4-5 years.

Economic status – June 2004

The values of macroeconomic indicators issued by the National Bank of Slovakia dated to June 30th 2004, confirm the positive development of the economy. The growth of GDP was 5.5%, the foreign debt went slightly down (3.478 US$ per capita) and the unemployment rate decreased from 16.6% in January 2004 to 13.2% in July 2004. Expected growth of GDP was about 4% together with real wage growth, with inflation not higher than 10% and in combination with declining unemployment, would result in further economic progress.

1.2.2 Legal and financial status of legal entities in the project

There are two groups of legal entities that will play an important role in project execution. The first is the operating entity and other private partners and the second is the public consortium. The role of these entities is rather different. The members of the public consortium signed a Memorandum of co-operation. The public consortium will create a strong public-private partnership with the operating entity Ekosluzby company. Participation of the Ministry of Environment is important to establish the legal framework for PCBs wastes and equipment phase-out.

It is essential that project partners are working closely together – state, public entities, private sector and general public to achieve complete destruction of PCBs and other POPs wastes but also to eliminate negative impact of high contamination by PCBs in Zemplin Region.

1.2.3 Project affected area & Project accounting unit

The project area in a wide sense is the Slovak Republic. The project site is planned to be in the vicinity of Chemko Strazske and the final disposition will be decided in consultation with the Government of Slovakia and the Consortium.

1.2.4 Economic life of the project

The procurement and deployment of technology through a two-tiered (technical and financial) international tendering process will be carried out in the first 24 months of the project life. Then the demonstration period will take the next 48 months. During the entire demonstration phase the project will be monitored and the last 6 months of the GEF-funded demonstration project will be devoted to evaluation of the project though the demonstration activities. Expected lifetime of the technology and destruction facility is 8 years at a minimum. The period of depreciation for construction parts of the equity is in financial analysis designed for 10 years, which almost corresponds to the lifetime of NC technology.

1.3 Project Costs

1.3.1 Capital costs required for the demonstration project

The capital costs of the project have been estimated at the price level of 2003. The capital costs comprise of two parts. The first part of capital expenses is the technical unit of NC technology and second one is related to construction costs for plant site. The capital costs of NC technology were estimated by literature survey. Construction costs for plant site have been estimated in accordance to UNIKA price list valid for 2003, that is the price list for construction works in Slovakia issued by the Chamber of Construction Professionals. In the financial evaluation, a contingency of 3% was added, because it is not possible to calculate the exact construction costs. In Slovakia the level of contingencies in such cases is usually between 3-6%.

Costs for technical assistance (training courses, translation, etc.) are not included into capital costs of the project. These costs were evaluated as the operational costs.

Table 1.1 Capital costs – summary table *Note: tax/levies – 19% of VAT (must be taken into account in cash flow management)*

	Costs in US$	**Costs in SKK**
Technology unit	5,970,000	179,100,000
Site preparation, setting up and civil engineering	2,480,000	74,400,000
Renting and other related costs (manipulation, storage etc.)	496,000	14,880,000
Sundries including insurance costs and communication	345,000	10,350,000
TOTAL	**9,291,000**	**278,730,000**

The first payment for technology will be done in 2005 (1 million USD), major investment will be done in year 2006 (3 million USD) and the rest in year 2007 and 2008.

In financial projection the replacement costs for machinery have not been estimated and the costs of maintenance are part of the operating costs.

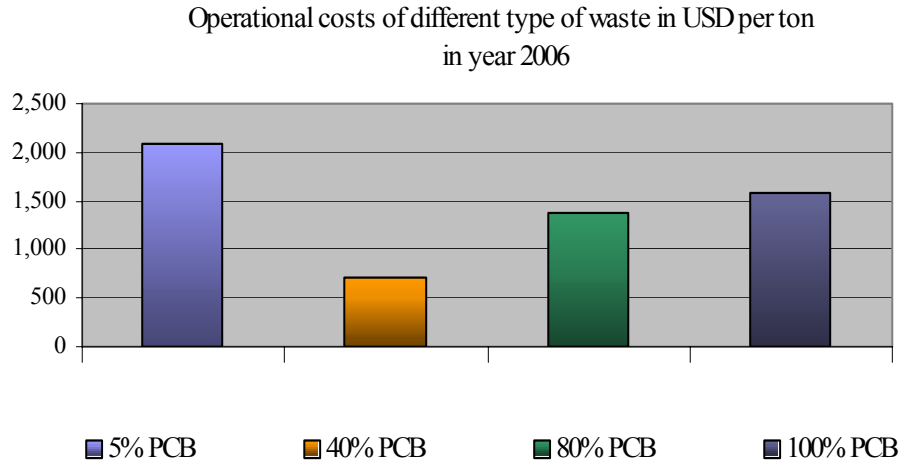
1.3.2 Operating and maintenance costs

In the financial analysis the operating costs have been calculated. The costs estimates were based on experts' opinion. It was mainly done for the operating costs of NCT and waste collection and processing (capacitors).

For particular type of costs the real growth was calculated. The real growth of 3% of wages is taken into account for full period of projection. Labour costs contain also the costs for social, health insurance and unemployment insurance (38% over the gross wages).

The price of electric energy in 2003 was SKK 2.60 per kWh. Increase in cost of electric energy has been taken into account in 2004-2005 at the rate of 2% each year. The increase represents the real increase. The price of other inputs was kept at the same level. In the financial model there is no increase of prices of other process inputs.

Processed waste has been categorized into 4 groups according to its PCB concentration in specific matrices (5% PCBs in mineral oil, 40% PCBs in capacitors, 80% PCBs in still bottoms, and 100% PCB oil). The operating costs -energy, chemicals, steam, etc. are different for different type of processed waste, depending on the organic content (see in Financial Tables, Operating costs of NC Technology). The waste with concentration of only 5% PCBs is from an operating cost point of view more expensive than other types because the balance of the waste is made up of mineral oil. The most effective processing of waste is capacitors, which have 40% PCB concentration with the balance being the metal capacitor carcass. The waste of 100% PCB concentration requires higher operating costs than the capacitors, due to the fact that more organic material is present. Differences in operational costs are shown in the next graph.



In the financial projection the processing of different wastes requires different lengths of time. Based on these time estimates, it was necessary to mix different types of waste to make processing economically feasible. In the projection, full time utilization of the annual capacity for processing was calculated. Only 2 weeks have been set aside for regular maintenance. This approach resulted in a maximum of 1053 shifts per year.

Maintenance costs for civil engineering are calculated as 0.5% of capital expenses in civil engineering. Maintenance costs for machinery are calculated as 1% of capital expenses. In 2005 no maintenance costs would be charged and in 2006 only 50% of estimated costs.

The industrial costs are calculated from direct costs. Direct costs consist from raw materials, energy, labour and maintenance. The base for calculation of administrative costs is the direct costs.

In financial projection the license fee is US$ 150,000 per year starting from 2007. For 2005-2006 there will be no license fee, because during this period there will be only preparatory activities for deploying the technology.

1.3.3 Operating revenues of the project

Operating revenues are exclusively generated from the processed waste.

Proposed system of prices

The system of prices has been built with the goal to cover all operating costs, financial costs of paid interest from a loan. The prices cover the depreciation related to the construction part of the capital costs, too. The system of prices reflects the different types of wastes. The price of waste processing reflects the costs for destruction. It depends on the level of PCB concentration.

The proposed system of prices and its development is shown in the next table.

Table 1.2 Price level and its development

	2006	
Type of Waste	USD/kg	SKK/kg
5% of PCB concentration	2.60	92.30
40% of PCB concentration	1.80	63.90
80% of PCB concentration	1.80	63.90
100% of PCB concentration	2.00	71.00
Increase in %		

Note: Prices are without VAT

1.3.4 Cash flow

The continuous generation of cash has been the major assumption for the project success and for its sustainability. Under the proposed financing structure of the project, the project generate positive net cash in particular years except in 2008 when the custom duties will be due, but cumulative cash flow is positive, and there would be enough money to cover this expenditure.

1.4 Financing Structure and Results of Analysis

The financing structure of capital expenses is determined by GEF grant. Grant represents 78.22% of total capital costs. According to the methodology for environmental projects the necessary financial gap was calculated. Using formula r = C / (C+R) where r is the financial gap in percent and C and R are the discounted costs and discounted revenues, respectively, i.e. by modified FRR/K method before defining financing structure, the need for gap level was calculated at level 74.27% of total capital costs.

A part of GEF grant used for covering costs, which are not typical capital costs such as ancillary expenses of technology deployment, amounts to US$368,000. Such costs include those for training, translation of documentation, etc. In 2006 and 2007 part of the GEF grant will partially cover construction costs for site preparation. The operating entity, through revenues collected from 2007, will contribute towards cost of SSE technology. This arrangement create the possibility to keep the project financial sustainable (cash accumulation) and to keep the prices for waste destruction at market level.

Table 1.3 Financial indicators

Attribute	Value
FRR/C	-%
NPV/C	-6,890,693
FRR/K	16.93 %
NPV/K	156, 544

The value of FRR/C is high minus, it means that the indicator converges to zero from minus infinity and consequently the NPV has reached the level –US$ 6,890,693, which in practice means that the project

without GEF grant does not make business sense. But it must be noted that the proposed project is not an investment project only but also one that would demonstrate both compliance with investment projects parameters and an emerging, innovative technology as well. At the front end of development of many innovative technologies this is likely be acceptable in the case of transfer of technologies.

Indicators related to evaluation of business involvement have reached the required level. FRR is higher than the discount rate (discount rate is 6%) and FRR/K is 16.93%, which is 3 times higher. The conclusion is that the project makes business sense for the operating entity, as the operations will generate revenues. Consequently, NPV has value US$ 156,544.

The above contradiction can be easily explained by the fact that when the destruction costs have been compared with the incineration costs, the capital cost requirements for the incinerators have not been taken into account. Current data, however, shows that a hazardous waste incineration system with only one kiln would require a capital costs of approximately or above US$ 30 million (the estimated capital costs of the recently established incinerator in Ostrava, Czech Republic).

2. Economic Analysis

2.1 Approach

The economic analysis is important especially in cases when FRR/C is lower than discount rate and NPV/C is negative as it is in this case. Then it is important to evaluate the economic impact to the project area.

Environmental infrastructure projects such as the current proposal bring additional socio-economic benefits and costs that are generally not captured in the project financial analysis related to capital expenses. These benefits, which will include environmental improvement in the project area, expansion of recreational opportunities and improved prospects for regional development, should be taken into account when considering the case for the use of public funds (for covering the expenses of destroying PCBs extracted from soil and sediment).

Public funds have to demonstrate a net economic benefit to society to justify their use. In environmental projects, the main challenge in the economic analysis is pricing the social and environmental benefits resulting from the project. In this case a variety of economic benefits to the project area, and Slovakia, can be identified but not all can be valued due to the lack of necessary data on either the scale of the impact or their monetary value.

2.2 Result of the economic evaluation

The following economic impact was evaluated:

- new jobs created within the construction phase - direct and indirect,
- direct jobs created within the operational phase, and
- increase of local GDP.

Direct and indirect jobs created within construction phase depend on the value of work realized by local companies – in this case from construction works and translation of manuals.

The increase of GDP is connected to elimination of barriers of local improvement of business in tourism, increase of land (based on improvement of quality of environment), increase of local production in household's supply etc. Based on this calculation the level of economic indicators is the following:

Table 2.1 Economic indicators

Attribute	Value
EFRR	42.09%
EFNPV	22,539,545 USD
Benefits/Costs	2.55

The economic interpretation of these values is: the economic benefit of the project area is 2.55 times higher than costs related to the project. In other words the project of US$ 20 million will provide an overall economic benefit of more than US$ 50 million.

The most part of NPV is created by elimination of environmental barriers in the project area. It represents 64.17%. The revenues from waste destruction represent 31.62%. Other benefits represent 4.21%. Economic internal rate of return is high - at the level 42.09%, which confirms the high benefits for Slovak Republic.

2.3 Analysis of Sensitivity and Analysis of Risks

The most critical parameter that will be tested in sensitivity and risk analysis from financial point of view is the fluctuation of exchange rates between US$ and with other currencies. The floating of US$ by 5% has negative impact to level of financial indicators. On the other hand the price level for waste destruction in EU is kept in euros that can partially eliminate this negative impact.

The second parameter that has strong impact to financial (not economic) result is volume of processed waste. The decrease of volume of waste (it could be expected that there will be a decrease of waste from soil) also has negative impact to financial (not economic) indicators. However, other PCB wastes that have not yet been identified and the amounts of which have shown increasing volumes in the national PCBs inventories will compensate this negative impact.

It is very important to mention that in both cases (of implementing of risks), where the negative financial impact is realized, the negative impact from economic point of view is rather small and economic indicators are at a very high. It is because the most part of the economic impact will be realized by eliminating barriers in GDP increase. The value of economic NPV related to the increase of GDP by elimination of environmental barriers represents 65.4% and then the negative impact from decrease of waste destruction will not be significant.

3. Affordability Analysis

For testing the affordability of the project it is important to compare the prices for waste processing by other types of technologies with the proposed system of prices in subject project. The prices proposed in the financial evaluation do not have significant financial advantage in comparison with other prices on the current market. The economic analysis, however, shows that the project will have a positive impact mainly by eliminating the environmental barriers, creating new jobs and increase local GDP. The economic benefit/costs is 2.55, that is the economic benefits are 2.55 times higher than the project costs. The economic internal rate of return is also high, it is over 42% that confirms the high socio-economic benefits gained through the project.

Annex 6: SCHEDULE OF PROGRAMME AND PROJECT REVIEWS AND EXTERNAL EVALUATIONS

	Activity	Planned dates
1	Inception Report	April 2006
2	Project Steering Committee Meeting	May 2006
3	Technical Advisory Group Meeting	July 2006
4	Project Advisory Committee Meeting	August 2006
5	Project Steering Committee Meeting	October 2006
6	Annual Project Report	February 2007
7	Project Advisory Committee Meeting	March 2007
8	Project Steering Committee Meeting	October 2007
9	Regional Workshop CEE	November 2007
10	Annual Project Report	February 2008
11	Technical Advisory Group Meeting	March 2008
12	Project Steering Committee Meeting	October 2008
13	Annual Project Report	February 2009
14	Regional Workshop Africa	August 2009
15	Project Steering Committee Meeting	October 2009
16	Annual Project Report	April 2010
17	Project Steering Committee Meeting	November 2010
18	Final Evaluation	September 2011

Annex 6a: DETAILED MONITORING AND EVALUATION PLAN

Project monitoring and evaluation (M&E) represents integral aspects of the project's design. Monitoring and evaluation will be interactive and mutually supportive activities. Monitoring – a continuous process of collecting and analysing information needed to measure the progress of the project toward expected results – will be frequent and thorough. It will provide the project manager and stakeholders with regular feedback to help them determine whether the project is progressing as planned. Monitoring will be supplemented by formal evaluations – periodic assessments of project performance and impact. Evaluations will also document what lessons are being learned from experience.

The project's M&E programme will be guided by a set of **indicators,** which represent a summary description of the expected results and impacts referred to above. It is expected that the currently proposed set of indicators (see below) will be further refined during the **Project Inception Phase (PIP**) subject to endorsement of the Steering Committee in their 1st meeting.

Aside from standard project functions such as ensuring correct auditing, etc, the primary objective of the project's M&E component is to help guide the project towards successful achievement of these indicators.

Table 1 below provides a summary of indicators related to outcomes:

Outcome		Indicator	Year					
			1	2	3	4	5	6
1	Improved capacity for environmentally sound management of POPs	Programme and Project Co-ordination and Support Unit located in Slovakia established	X					
		Project Management Established	X					
		Proper legislation concerning PCB management implemented		X				
2	Destruction of 1,000 tonnes of PCB waste over the first 42 months of the GEF Project, transfer of non-combustion POPs destruction technology to Slovakia	Tender documents developed and approved	X					
		Technology selected, contract prepared and signed		X				
		Non-Com Technology installed		X				
		Wastes disposal started			X			
		1,000 tones of PCB wastes destructed				X		
3	Destruction of 1,500 tonnes of PCB waste over the last 30 months, transfer of sediment and soil extraction technology to Slovakia	Tender documents developed and approved for extraction unit		X				
		Technology selected, contract prepared and signed			X			
		Extraction Technology installed				X		
		Sediment and contaminated soil extraction started				X		
		1,500 tones of PCB wastes destructed					X	X
		Capital Equipment Transfer finalized						X
4	Project effectively monitored, evaluated, and results	Environmental monitoring protocols developed	X					
		Environmental monitoring done		X			X	X
		Analysis of contamination levels in canal sediment, river and lake			X	X		

	results disseminated and mechanisms in place to facilitate project replication and sustainability	Central and Eastern European approach developed					X	
		Regional Workshops organized			X	X		
5	Increased public-private partnership involvement	Additional co-financing funds mobilized					X	X

GEF guidelines for Implementing Agencies to conduct Terminal Evaluations

Background

Terminal evaluations of projects by Implementing and Executing Agencies under expanded opportunities. (IAs/EAs) represent one of the modalities under the GEF M&E evaluation program. All regular and medium sized projects supported by the GEF are required to undergo a terminal evaluation upon completion of implementation. The present document describes the minimum requirements for terminal evaluations of a GEF supported project, which are considered complementary to those required by IAs/EAs. The guidelines comprise first the principles to conduct terminal evaluations and subsequently the scope of these evaluations. A terminal evaluation reviews the implementation experience and achievement of results of the project in question against the project objectives endorsed by GEF, including changes agreed during implementation.

GEF Principles for conducting terminal evaluations

- The IAs/EAs responsible for the project will arrange for the terminal evaluation.
- A team of independent consultants will conduct the evaluation. These consultants should not have participated substantively during project preparation and/or implementation and should have no conflict of interest with any proposed follow-up phases. It would also be advisable for the team to be comprised of professional with a wide range of skills – strong analytical and evaluation experience, expertise in technical aspects of the project, global environmental issues and experience with economic and social development issues.
- The duration and scope of the evaluation depends on the complexity of each project and should be reflected in the TORs.
- The evaluation should be completed within 6 months of closing of all project activities.
- Major project stakeholders at the national and local levels should be involved.
- If the project did not establish a baseline (initial conditions), the evaluator should seek to determine it through the use of special methodologies so that achievements, results and impacts can be properly established.
- It would be advisable to take advantage of the project M&E components and the logframe of the project design (M&E components should be evaluated).
- Evaluators should have an updated knowledge of GEF policies and strategies. A brief presentation of specific GEF terminology is provided below.

Scope

The scope of the terminal evaluation will depend upon type of project, size, focal area, and country context. However, the following issues should be covered:

- An analysis of the attainment of global environmental objectives, outcomes/ impacts, project objectives, and delivery and completion of project outputs/ activities (based on indicators).
- Evaluation of project achievements according to GEF Project Review Criteria:

1. Implementation approach
2. Country ownership/Driveness
3. Stakeholder participation/ Public Involvement
4. Sustainability
5. Replication approach
6. Financial planning
7. Cost-effectiveness
8. Monitoring and evaluation

Each terminal evaluation will include **ratings** on the following criteria:
(a) Outcomes/Achievement of objectives (the extent to which the project's environmental and development objectives were achieved);
(b) Implementation Approach;
(c) Stakeholder Participation/Public Involvement;
(d) Sustainability; and
(e) Monitoring & Evaluation.

The ratings will be: Highly Satisfactory, Satisfactory, Marginally Satisfactory, Unsatisfactory, and N/A. This system will allow consistency across all IAs/EAs.

Terminal evaluations should present and analyze main findings and key lessons, including examples of best practices for future projects in the country, region and GEF (technical, political, managerial, etc.). Evaluations should also have an annex explaining any differences or disagreements between the findings of the evaluation team, the IA/EA or the GEF recipient organization. A terminal evaluation is not an appraisal of a follow-up phase.

Communications with GEF M&E

Each IA/EA should confirm by May 15, the terminal evaluation schedule presented with the PIR. This information will include the approximate timing of the completion report. The final evaluation reports will be sent to the GEF M&E unit no later than 4 weeks after the final version is completed.

Explanation of Terminology

Implementation Approach includes an analysis of the project's logical framework, adaptation to changing conditions (adaptive management), partnerships in implementation arrangements, changes in project design and overall project management.

Some elements of an effective implementation approach may include:

- The logical framework used during implementation as a management and M&E tool
- Effective partnerships arrangements established for implementation of the project with relevant stakeholders involved in the country/region.
- Lessons from other relevant projects (e.g., same focal area) incorporated into project implementation.
- Feedback from M&E activities used for adaptive management.

Country Ownership/Drivenness is the relevance of the project to national development and environmental agendas, recipient country commitment and regional and international agreements where applicable.

Some elements of effective country ownership/drivenness may include:

- Project Concept has its origin within the national sectoral and development plans
- Outcomes (or potential outcomes) from the project have been incorporated into the national sectoral and development plans
- Relevant country representatives (e.g., governmental official, civil society, etc.) are actively involved in project identification, planning and/or implementation.
- The recipient government has maintained financial commitment to the project
- The government has approved policies and/or modified regulatory frameworks in line with the project's objectives.

For projects whose main focus and actors are in the private sector rather than public sector (e.g., IFC projects), elements of effective country ownership/drivenness that demonstrate the interest and commitment of the local private sector to the project may include:

- The number of companies that participated in the project by: receiving technical assistance, applying for financing, attending dissemination events, adopting environmental standards promoted by the project, etc.
- Amount contributed by participating companies to achieve the environmental benefits promoted by the project, including equity invested, guarantees provided, co-funding of project activities, in-kind contributions, etc.
- Project's collaboration with industry associations.

Stakeholder Participation/Public Involvement consists of three related, and often overlapping processes, information dissemination, consultation and "stakeholder" participation. Stakeholders are the individuals, groups, institutions or other bodies that have an interest or stake in the outcome of the GEF-financed project. The term also applies to those potentially adversely affected by a project.

Examples of effective public involvement include:
Information dissemination

- Implementation of appropriate outreach/public awareness campaigns
- Consultation and stakeholder participation
- Consulting and making use of the skills, experiences and knowledge of NGOs, community and local groups, private and public sectors and academic institutions in the design, implementation and evaluation of project activities

Stakeholder participation

- Project institutional networks well placed within the overall national or community organizational structures, for example, by building on the local decision making structures, incorporating local knowledge and devolving project management responsibilities to the local organizations or communities as the project approaches closure
- Building partnerships among different project stakeholders
- Fulfillment of commitments to local stakeholders and stakeholders considered to be adequately involved.

Sustainability measures the extent to which benefits continue, within or outside the project domain from a particular project or programme after GEF assistance/external assistance has come to an end. Relevant factors to improve the sustainability of project outcomes include:

- Development and implementation of a sustainability strategy
- Establishment of the financial and economic instruments and mechanisms to ensure the ongoing flow of benefits once the GEF assistance ends (from the public and private sectors, income generating activities and market transformations to promote the project's objectives).
- Development of suitable organizational arrangements by public and/or private sector
- Development of policy and regulatory frameworks that further the project objectives
- Incorporation of environmental and ecological factors affecting future flow of benefits.
- Development of appropriate institutional capacity (systems, structures, staff, expertise, etc.).
- Identification and involvement of champions (i.e. individuals in government and civil society who can promote sustainability of project outcomes)
- Achieving social sustainability, for example, by mainstreaming project activities into the economy or community production activities
- Achieving stake holder's consensus regarding courses of action on project activities.

Replication approach, in the context of GEF projects, is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects. Replication can have two aspects, replication proper (lessons and experiences are replicated in different geographical area) or scaling up (lessons and experiences are replicated within the same geographic area but funded by other sources). Examples of replication approaches include:

- Knowledge transfer (i.e., dissemination of lessons through project result documents, training workshops, information exchange, national and regional forum, etc.).
- Expansion of demonstration projects.
- Capacity building and training of individuals, and institutions to expand the project's achievements in the country or other regions.
- Use of project-trained individuals, institutions or companies to replicate the project's outcomes in other regions.

Financial Planning includes actual project cost by activity, financial management (including disbursement issues), and co-financing. If a financial audit has been conducted, the major findings should be presented in the TE.

Effective financial plans include:

- Identification of potential sources of co-financing as well as leveraged and associated financing.
- Strong financial controls, including reporting, and planning that allow the project management to make informed decisions regarding the budget at any time, allows for a proper and timely flow of funds and for the payment of satisfactory project deliverables.
- Due diligence due diligence in the management of funds and financial audits.

Cost-effectiveness assesses the achievement of the environmental and developmental objectives as well as the project's outputs in relation to the inputs, costs and implementing time. It also examines the project's compliance with the application of the incremental cost concept. Cost-effective factors include:

- Compliance with the incremental cost criteria (e.g. GEF funds are used to finance a component of a project that would not have taken place without GEF funding) and securing co-funding and associated funding.
- The project completed the planned activities and met or exceeded the expected outcomes in terms of achievement of Global Environmental and Development Objectives according to schedule and as cost-effective as initially planned.
- The project used either a benchmark approach or a comparison approach (did not exceed the costs levels of similar projects in similar contexts). A benchmark approach in climate change and ozone projects measures cost-effectiveness using internationally accepted threshold such as 10$/tonne of carbon equivalent reduced, and thresholds for the phase out of specific ozone depleting substances

measured in terms of dollars spent per kg ($/kg) of each type of ODS reduced. In this project of POPs similar indicators will be developed depending on the local conditions of the country, the EU policy factors and the general progress in the global implementation of the Stockholm Convention.

Annex 7: INCREMENTAL COST ANALYSIS

Regional Context and Broad Development Goals

Stockpiles of POPs and accumulations of obsolete POPs in developing countries and countries with economies in transition pose a potentially serious threat to the environment and human health. They may be poorly managed and stored in facilities with inadequate measures to prevent releases to the environment and surrounding communities. PCBs, a principal subject of the Stockholm Convention and the initial targeted contaminant of this Project and Programme, are especially ubiquitous, and PCB wastes are being found in any country that has a long established power grid, and in countries that produced PCBs or PCB-containing equipment and products. However, due to the poor management, it has been estimated that from 1.5 million tones of PCBs that had been produced throughout the world since 1929, to date about 31 % has already escaped into the environment. This project can clearly substantiate the above statement as this particular hotspot in Slovakia was recognized and described in the Regional Report of GEF/UNEP Project "Regional Based Assessment of Persistent Toxic Substances" as one of the most polluted sites in Europe (and probably in the world).

The removal of barriers that currently impede the deployment of non-combustion technologies will enable countries to address POPs destruction needs through the use of technologies that emphasize and result in high destruction efficiency, or DE, a measure that is almost never reported or calculated for incinerators, cement kilns and other combustion technologies because these devices typically fail to achieve high total destruction efficiencies. Even Class 4 hazardous waste incinerators of high temperature combustion and equipped with sophisticated air pollution control system (APS), that can be found in some Western European countries and in North America, generate significant total releases of unintentional POPs. Even if a regulatory value of 0.1 ng TEQ/Nm^3 is strictly enforced, a Class 4 facility may typically[3] release 0.75 ng TEQ[4] into air and 30 ng TEQ into fly ash per kg of hazardous waste incinerated. Hence the demonstration of the viability of a non-combustion technology of high DE will provide an alternative not only to hazardous waste incinerators of high temperature combustion and equipped with sophisticated APS that would be difficult to afford in developing countries and countries with economies in transition but different other combustion technologies that are unfortunately still applied for hazardous waste disposal in many developing and transition economy countries. Thus the creation of viable, non-incineration approaches to POPs destruction results in a global benefit through improved destruction efficiency and yields a corresponding environmental benefit.

The Non-Combustion Programme and first country specific Project in Slovakia is a Global initiative aimed at removing or reducing barriers to the deployment of Non-Combustion technologies to destroy POPs stockpiles in developing countries and countries with economies in transition, and will therefore lead to the further adoption and effective implementation of these available technologies. The Programme and Project have been significantly driven and supported by international NGOs (among others the Environmental Health Fund and the International Pesticides Elimination Network, or IPEN), the UNIDO, and UNDP. The Global Environment Facility began its Preparation support for the Programme and Project originally under Operational Programme #10, the Contaminants-Based Operational Programme. As the GEF has now been designated as the Interim Principal Financial Mechanism for the Stockholm Convention, the Programme and Project has become part of the POPs focal area (Operational Programme #14).

The Programme and first Project in Slovakia will result in cross-programmatic benefits for the GEF. Linkages are being established with POPs Enabling Activities in the target countries. This cross-linkage is particularly evident in Slovakia where preparation activities for this Project have been explicitly considered

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[3] UNEP Chemicals: Draft "Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases", January 2001.

[4] TEQ is defined as Toxic Equivalent which is a measure of the toxicity of a mixture of compounds that elicit dioxin-like activity, expressed as the equivalent toxicity of 2,3,7,8 dioxin

and where synergistic linkages have resulted. Project sustainability has been strengthened by linking the Project into the work of Enabling Activity Inventory development, and stockpiles additional to the targeted 1000 tonnes stockpile of PCBs are and will continue to be defined as part of Enabling Activity work, and will be channelled as appropriate to the planned destruction unit for treatment. In addition, Slovakia is committed to using the destruction unit to address approximately 40,000 tonnes of contaminated soil and sediment, and a resulting 4,000 tonnes of condensed distillate, that would result in the mitigation of a "hotspot" designated in Annex 5 of the Danube River Basin Pollution Reduction Programme Report, the subject of an ongoing GEF Project under Operational Programme #8. Last, the Programme and Project will yield an additional Regional and Global benefit by creating direct linkages with related GEF Projects such as the Africa Stockpiles Programme and the UNEP implemented and UNIDO executed Medium Size project (MSP) aimed at NGO capacity building. Direct linkages with other GEF Projects and related programmes will be actively sought and developed.

The barriers that have been determined to exist and have been explored during Project Preparation would likely not be overcome or even addressed were it not for the existence of a GEF Programme and Project. Lack of information and technical knowledge regarding Non-Combustion Technologies, the nature of existing regulations and standards, and the lack of a regime for public policy and institutional infrastructure, all consistent with, and arguably necessary to realization of the Stockholm Convention requirement, to encourage best available techniques. Reduction or removal of the barriers listed above and described in the proposed Programme and Project would assist in realizing such a "priority consideration."

Given the very high levels of Destruction Efficiencies (DEs) of the selected technology for the initial Project in Slovakia, DEs approaching 100%, the Programme and Project will significantly facilitate realization of the objective of Article 6, Section (d) (ii) which states, in part, that releases from stockpiles and wastes be "disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants."

Discussions aimed at defining Best Available Techniques as referred to in Annex C (Unintentional Production) of the Stockholm Convention, are progressing in the BAT/BEP Expert Group. Notwithstanding the achievements of this Expert Group, the Programme and Project will yield interesting and likely useful information in relation to the Stockholm Convention requirement in Part IV, Section B., (b), that "When considering proposals to construct new facilities or significantly modify existing facilities using processes that release chemicals listed in the Annex, priority should be given to alternative processes, techniques or practices that have similar usefulness but which avoid the formation and release of such chemicals."

The Programme and Project are also consistent with Article 12 of the Stockholm Convention wherein the Parties recognize the need to make render timely and appropriate technical assistance to developing countries and countries with economies in transition. Most specifically the Programme and Project is responsive to Article 12, Section 4 that states, *inter alia*, that "Parties shall establish, as appropriate, arrangements for the purpose of providing technical assistance and promoting the transfer of technology to developing country Parties and Parties with economies in transition relating to the provisions of this Convention."

The proposed, extensive Civil Society consultations and other communications envisaged as part of the Programme and Project will give very broad visibility to, and enhance prospects for successful replication of, Programme and Project results at Local, National, Regional and Global levels. These extensive consultations will make possible addressing and reducing or removing the barriers that have been identified for the initial Project country. In this sense the Programme and Project is fully consistent with all provisions that are the subject of Article 10 of the Convention, titled Public information, awareness, and education. Indeed, the Programme and Project can serve as a model for future attempts to realize the objectives of this particular Convention Article.

Baseline

For the first project country, Slovakia, which is an early Accession Country to the European Union, the baseline is defined by the EU requirement for the treatment of PCB stockpiles. This requirement sets 2010 as the deadline for treatment of PCB stockpiles and generally requires incineration to a specific standard or superior alternative. As the 2,500 tonnes targeted stockpile of PCB product is largely of the more difficult to treat solids, an average cost of US$ 3,000 per tonne has been calculated. The total baseline of US$ 7,500,000 is comprised of the baseline activities and liabilities of the holders of the 2,500 tonnes of PCB that constitute the targeted stockpile to be addressed during project implementation. The domestic benefits to be expected from the clean-up of associated wastes matrices is an estimated apportionment amounting to approximately US$ 4,500,000.

The GEF Alternative

The GEF alternative very likely provides the only possibility that very promising and already available and demonstrated alternative technologies to incineration can be sustainably deployed. For this Global Demonstration Programme and associated Project, a substitutional (vs. complementary) Incremental Cost approach has been used: rather than spending US$ 7,500,000 to incinerate the targeted PCB stockpile, the project will substitute the use of the selected Non-Combustion technology for this purpose, and thus this amount becomes Project co-finance. The total amount of co-finance from private entities, including Chemko, is US$ 6,121,000.] In addition, the Government of Slovakia (at the national, regional and local levels) is committing US$ 3 million, which it would have had to spend in some way on remediation of the contaminated soils and sediments leaching into the Zemplinska Sirava Lake. It should be noted however that the GEF alternative allows for a significant acceleration of the plans to remediate this regional hotspot of global significance, as it is unlikely that the Government would have been in a position to declare it a priority in the immediate future, were it not for the opportunity created by the GEF alternative.

Indeed, cleaning up these wastes will result both in regional and global benefits through remediation of the Danube watershed, but will also provide considerable domestic benefits in reducing health threats to users of the Zemplinska Sirava Lake, and potentially increase tourism revenues. A detailed analysis both of pollutants pathways and cost/benefit of water quality improvements following remediation would be necessary to permit the precise apportionment of the GEF grant and the Government co-financing. Such an analysis would require more time and effort then possible within the context of the preparation of this project, and even then would not be guaranteed to lead significant results. Therefore, the relative GEF and Government contributions, which were derived after iterative negotiations, represent a satisfactory “cost-sharing” arrangement.

Under the GEF funded alternative the environmentally sound destruction of the stockpile by using a non-combustion technology will be the dominant Programme and Project objective (and the clean up of the contaminated site within the immediate vicinity of the stockpile will be a secondary objective). Extensive Local, National, Regional and Global Civil Society participation will also receive considerable GEF funding. There would also be GEF support and co-finance for Programme and Project Coordination, Capital Equipment Purchase and associated expenditures, Effective and Specific Actions to ensure successful Project Replication and Sustainability, and further promotion of public-private partnerships.

More specifically, the GEF Alternative (GEF contributions and co-finance) would provide US$ 795,000 for Programme and Project Coordination; US$ 13,929000 for Capital Equipment Purchase and Deployment and Operating expenses; US$ 3,620,000 for Effective and Specific Actions to Ensure Project Replication and Sustainability (Capacity Building); and US$ 1,070,000 for further promotion of public-private partnerships.

Summary Incremental Cost Table (in US$**)**

Component	Baseline	Alternative	GEF	Co-finance
Improved Capacity and Coordination	0	795,000	665,000	130,000
Transfer of non-combustion POPs technology and destruction of 1,000 tonnes	3,000,000	9,258,000	6,567,000	2,691,000
Transfer of technology for sediment and soil extraction and destruction of 1,500 tonnes	4,500,0000	4,671,000	1,212,000	3,459,000
Monitoring and Evaluation, and dissemination	0	3,620,000	769,000	2,851,000
Strengthen public, Civil Society and private sector participation	0	1,070,000	50,000	1,020,000
Total	7,500,000	19,414,000	9,263,000	10,151,000
GRAND TOTAL	**7,500,000**	**20,155,040***	**10,004,040***	**10,151,000**

** including Support Costs*

Incremental Costs and Project Financing

Component	*Sub-component*	Baseline (US$)	Alternative (US$)		Co-financing (US$)					
					GEF	Private Entity	Slovak Republic	NGO	UNDP	UNIDO
1. Improved capacity for Programme and Project Co-ordination	1.1 Establish Programme and Project co-ordination and support	0	341,000		246,000				95,000	
	1.2 Recruit and hire Programme Coordinator	0	114,000		109,000					5,000
	1.3 Recruit and hire National Project Director	0	135,000		135,000					
	1.4 Assure Cross GEF and other related Project coordination and communication, including interpretation and translation as appropriate in Slovakian	0	50,000		25,000					25,000
	1.5 Plan and Host a minimum of two (2) Programme Advisory Committee Meetings, three (3) Project Steering Committee Meetings, and three (3) Technical Advisory Group meetings	0	155,000		150,000					5,000
2. Capital Equipment Purchase, Deployment and operation to address 1,000 tonnes of POPs waste	2.1 Capital Equipment Purchase to destroy POPs in different matrices and extraction unit	0	5,349,000		4,599,000	750,000				
	2.2 Legal and technical requirements	0	54,000			16,000	32,000	6,000		
	2.3 Design, Construction and Test Operation	0	1,660,000		1,660,000					

Component	*Sub-component*	**Baseline (US$)**	**Alternative (US$)**	**Co-financing (US$)**					
				GEF	**Private Entity**	**Slovak Republic**	**NGO**	**UNDP**	**UNIDO**
	2.4 Unit Operation Costs to destroy the targeted stockpile including collection, storage and delivery of PCB product	3,000,000	1,655,000		1,655,000				
	2.5 Project Management Supervision (Monitoring) during technology transfer to Slovakia incl. site preparation (construction) and performance tests (with limited chemical analytical sampling and testing	0	40,000	10,000					30,000
	2.6 Training of Project Personnel in Slovakian and Technology Transfer Costs	0	147,000	147,000					
	2.7 Provide the managerial structure, site supervision and compliance, labor force, and make available and ensure the continuous supply of PCB wastes, PCB-containing equipment, PCB-containing wastes, etc. as well as the necessary processing chemicals as raw materials to enable destruction of the targeted wastes and associated waste matrices in the demonstration area.		353,000	151,000		200,000			2,000
3. Capital Equipment purchase, deployment and operation to address 1,500 tonnes of POPs wastes	3.1 Design, construction and test operations of the sediment and soil extraction	0	1,917,000	937,000	980,000				

Component	*Sub-component*	**Baseline (US$)**	**Alternative (US$)**	**Co-financing (US$)**					
				GEF	**Private Entity**	**Slovak Republic**	**NGO**	**UNDP**	**UNIDO**
	3.2 Legal and environmental requirements		81,000		24,000	48,000	9,000		
	3.3 Unit Operation Costs to destroy the targeted stockpile including nationwide collection, storage and delivery of PCB product	4,500,000	2,000,000		2,000,000				
	3.4 Project Management Supervision (Monitoring) during technology transfer to Slovakia including site preparation (construction) and performance tests (with limited chemical analytical sampling and testing)		60,000	15,000					45,000
	3.5 Training of Project Personnel in Slovakian and Technology Transfer Costs		221,000	221,000					
	3.6 Site preparation for deployment of sediments extraction technology close to the source of contamination specifically at selected area of industrial canal. Site selection will be made after reconfirmation of available analytical survey data		200,000			200,000			
	3.7 Finalize Capital Equipment transfer arrangements and records of discussions incl. systems of supply of PCBs waste and contaminated sediments		42,000	39,000					3,000
	3.8 After concentrating at site, PCBs concentrate will be transported to the destruction unit for final disposal		150,000			150,000			

Component	*Sub-component*	**Baseline (US$)**	**Alternative (US$)**		**Co-financing (US$)**					
					GEF	**Private Entity**	**Slovak Republic**	**NGO**	**UNDP**	**UNIDO**
4. Effective, Specific actions to ensure Project Replication and Sustainability (Capacity building)	4.1 Develop monitoring protocols and project evaluation framework and translated to Slovakian		100,000		25,000		25,000	25,000		25,000
	4.2 Monitoring and Evaluation during POPs Destruction (Project Implementation) Phase	0	565,000		110,000	200,000	200,000	40,000		15,000
	4.3 Analysis of contamination levels in canal sediment, river and lake	0	500,000				500,000			
	4.4 Provide technical and other information for monitoring and assistance to public and private sector for replication of the experience	0	25,000				25,000			
	4.5 Assure continuing Civil Society involvement in Project activities in Slovakia, including a presence in Monitoring and Evaluation	0	165,000		60,000		35,000	60,000		10,000
	4.6 Develop a CEE Regional Approach to the use of Non-combustion technologies	0	520,000		80,000			25,000		415,000
	4.7 Assure continuing Civil Society involvement at CEE regional level	0	124,000		89,000			25,000		10,000
	4.8 Organize and implement two additional Regional Workshops to disseminate information on Non-combustion technologies and share lessons learned and assure continuing Civil Society participation at the global level	0	245,000		200,000			40,000		5,000

Component	*Sub-component*	**Baseline (US$)**	**Alternative (US$)**		**Co-financing (US$)**					
					GEF	**Private Entity**	**Slovak Republic**	**NGO**	**UNDP**	**UNIDO**
	4.9. Continue assessment of additional and emerging technologies that meet Project Selection Criteria	0	65,000		50,000			10,000		5,000
	4.10 Prepare and Distribute Project Semi-Annual reports and Final Reports on project activities (in English and Slovakian)	0	80,000		60,000			10,000		10,000
	4.11 Provide programmes for State to perform maintenance and regular collection of data and inventories, information gathering, waste management and coordination by the state authorities	0	400,000				400,000			
	4.12 Assure senior level Project representation at Stockholm Convention meetings and other relevant fora	0	100,000		60,000					40,000
	4.13 Miscellaneous	0	681,000			496,000	185,000			
	4.14 Create and maintain a project web site	0	50,000		35,000			10,000		5,000
5. Strengthen public and private sector participation	5.1 Further develop public/private partnership to recruit donors.	0	1,020,000		10,000		1,000,000	5,000		5,000
	5.2 Mobilise additional co-financing funds, if needed to implement public/private partnership activities that were unforeseen by the project during implementation.	0	50,000		40,000			5,000		5,000
AOS		0	741,040		741,040					
TOTAL		**7,500,000**	**20,155,040**		**10,004,040**	**6,121,000**	**3,000,000**	**270,000**	**95,000**	**665,000**

Annex 8: TECHNOLOGY OVERVIEW BASED ON PROJECT SELECTION CRITERIA

AVAILABLE NON-COMBUSTION POPS DESTRUCTION TECHNOLOGY

Introduction and scope

This document was prepared for the first meeting of the Technical Advisory Group of the UNIDO/UNDP/GEF Project: *Demonstration of Viability and Removal of Barriers that Impede Adoption and Effective Implementation of Available, Non-combustion Technologies for Destroying Persistent Organic Pollutants.*

The issues to be covered include:

- What criteria are the relevant criteria for selecting non-combustion technologies?
- What technologies are available commercially?
- Which of the technologies meet the basic requirements of the developed criteria.

The scope of the current document is limited to available non-combustion destruction technologies for POPs. It includes no discussion or evaluation of additional technologies or techniques for the remediation of soils, sediments and groundwater.

Sources of information

This report is based primarily on information that is freely available in the public realm from sources such as the United States Environment Protection Agency (USEPA), United Nations Environment Programme (UNEP), US Department of Energy (USDOE), NATO Committee on Challenges in Modern Society (CCMS), and freely available information from several Technology Vendors.

A bibliography of sources is contained at the end of this report, and all documents will be made available electronically prior to the TAG meeting.

The Task of the Technical Advisory Group

Project Development Funds (PDF-B) have been granted to prepare a UNIDO/UNDP/GEF Project titled: *Demonstration of Viability and Removal of Barriers that Impede Adoption and Effective Implementation of Available, Non-combustion Technologies for Destroying Persistent Organic Pollutants.*

The proposed Project will destroy a large stockpile of PCBs in each of two countries: the Philippines and Slovakia. The Project t will do this utilizing commercially available non-combustion technologies that meet Project criteria. The Project will also help remove barriers to the further adoption and effective implementation of such technologies.

The Project recognizes that in recent years, newer technologies have emerged and been commercialized that can be used in the destruction of POPs stockpiles (and some other species of persistent toxic substances). With regard to these newer technologies, the Project Document states:

> *"Some of them have operating characteristics that make them far superior to incinerators. They appear to be capable of being operated in ways that avoid problems that have been associated with the expert and public opposition to incinerators and other combustion technologies. These technologies can directly destroy POPs that are present in obsolete chemical stockpiles and in contaminated wastes and can be combined with other cleanup technologies to destroy POPs (and certain other PTS) trapped in soils and sediments."*

The Project Document identifies two specific characteristics that, at a minimum, the destruction technologies selected by the Project should demonstrate:

1. *They operate in systems that are essentially closed. This means that uncontrolled releases of POPs and other substances of concern can be avoided and all residues from the destruction process (gaseous, solid and/or liquid) can be contained, analyzed and, if necessary, further processed prior to release. It also means that the technology can avoid the periodic "upsets" that plague incinerators and other open destruction process.*
2. *They can achieve total destruction efficiencies (DEs) for POPs and other substances of concern that approach 100%. This means that they not only effectively eliminate gaseous, air-emissions of POPs and other toxic pollutants of concern but they also effectively eliminate releases of these pollutants as solid wastes and as liquid wastes.* [5] *(This approach conforms to the terms of the Stockholm Convention where the obligation is to reduce "total releases" to all media with the goal of "their continuing minimization and where feasible ultimate elimination.").*

The Project Document suggests that available and effective technologies that demonstrate the above two characteristics are most likely to win broad acceptance within civil society. It also suggests that such technologies are also particularly well suited to satisfy provisions of the Stockholm Convention on POPs, especially those detailed in Articles 5 and 6; and in Annex C.

The task of the Project Technical Advisory Group (TAG) is to assist the Project in the establishment of preliminary criteria and guidelines to be used in selecting and deploying technologies that are appropriate to this demonstration activity. Further, the TAG will also assist the Project in identifying a range of available technologies and technology vendors that appear to have the capacity to satisfy the established criteria and guidelines.

The starting point for this activity is the approved GEF PDF B. This calls for the selection of non-combustion technologies that incorporate the two specific characteristics listed above. These are the technical criteria that any destruction technology selected by the Project must demonstrate. In addition, the PDF B also requires that the selected technology be *"commercially available."*

Some provisions of Stockholm Convention on POPs

According to the Stockholm Convention, Parties are to take measures so that POPs wastes are:

> *"Disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants or otherwise disposed of in an environmentally sound manner when destruction of irreversible transformation does not represent the environmentally preferable option ..."* (Article 6, 1. (d) (ii))

Further, measures are to be taken so that POPs wastes are:

> *"Not permitted to be subject to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants."* (Article 6 (d) (iii)).

[5] Total destruction efficiency (DE) is almost never reported or calculated for incinerators, cement kilns and other combustion technologies because these devices typically fail to achieve high total destruction efficiencies. Rather, most regulatory agencies only require a measure of the so-called "*destruction and removal efficiency*" (DRE). This measure only takes into account contaminants that re present in the stack gases (air emissions), but ignores toxic contaminants of concern released as solid and liquid residues (as waste ash and waste water). Modern incinerators achieve high reported DREs by using filters, scrubbers and other stack gas cleaning devices to capture pollutants of concern, remove them from the device's gaseous emissions, and transfer them to solid waste and/or liquid waste residues. As a result, when only a device's DRE is considered, and when a measure of its total DE is avoided, this encourages the selection and deployment of technologies that transfer contaminants from stack gases into other media (water and ground). The use of DE as a measure, on the other hand, encourages the selection and deployment of technologies that efficiently destroy and eliminate POPs and other organic pollutants.

Also, parties shall:

> "Promote the development and, where it deems appropriate, require the use of substitute or modified materials, products and processes to prevent the formation and release of the chemicals listed in Annex C *[i.e. dioxins/furans and other by-product POPs]". (Article 5 (c).*

In addition, Parties must promote Best Available Techniques, and must require Best Available Techniques – following an implementation schedule – for certain specific dioxin source categories, including waste incinerators. (Article 5 (d)). In the Convention's definition of Best Available Techniques, we read:

> *"When considering proposals to construct new facilities or significantly modify existing facilities using processes that release ...* [dioxins/furans] *…, priority consideration should be given to alternative processes, techniques or practices that have similar usefulness but which avoid the formation and release of such chemicals."* (Annex C, Part V, B. (b).

These Stockholm Convention Provisions suggest dumping POPs wastes in landfills, deep-wells, or salt mines should be avoided. Nor should POPs wastes be recycled or processed/treated if the process results in outputs, including residues or by-products, exhibiting POPs-like characteristics.

The following proposed criteria for POPs destruction technologies reflect the above concerns. A proposed destruction technology should:

1. Prevent the formation of dioxins, furans and other by-product POPs.
2. Prevent the release of dioxins/furans and other by-product POPs.
3. Not generate any wastes with POPs characteristics.
4. Avoid POPs disposal methods, which are non-destructive (e.g. landfilling, recycling, deep-well injection, etc.)

Considerations in the selection of non-combustion technologies

The Project Document lists two specific characteristics that, at a minimum, the destruction technologies selected by the Project should demonstrate. For the purpose of this discussion these criteria can be simplified as follows:

An effective destruction efficiency of 100% - taking into account all inputs and releases;

Complete containment of all process streams to enable testing and reprocessing if necessary to ensure (1);

These criteria appear to be compatible and supportive of those proposed to reflect the provisions of the Stockholm Convention.

Destruction Efficiency is a very important criterion upon which the effectiveness of a given technology should be judged. First, however, proposed technologies should be eliminated from consideration if they do not meet fundamental Project requirements. In particular, any technology should be removed from consideration if:

1) It is a combustion (or an incineration) technology;
2) It produces dioxins (or other POPs) as an intrinsic characteristic;
3) It has an inability to contain all process streams/release; and/or
4) It is not commercially available.

Surviving technologies should be ranked according to the relative merits based on treatment effectiveness, capability to contain and re-process process streams, commercial availability, safety, hazards, etc as detailed previously.

Overview of available technologies

From the criteria discussed above, it is obvious that a number of commonly utilised POPs destruction technologies should not be considered for POPs waste treatment under the terms of the Project Document. These include combustion technologies such as incineration in dedicated burners, co-incineration, waste-to-energy burners, cement kilns, boilers, open burning, etc.

A summary of destruction technologies follows.

Initial screening matrix for POPs destruction technologies

Technology	**Non combustion destruction technology**	**Intrinsic PCDD/F formation**	**Capable of containing all process streams**	**Capable of reprocessing all process streams**	**Demonstrated high DE**
Incineration [6]	no	yes	No	no	no
GPCR - Ecologic	yes	no	Yes	yes	yes
Base Catalyzed Dechlorination	yes	no	Yes	yes	yes
Sodium reduction process(es)	yes	no	?	?	no
Solvated electron process	yes	no	Yes	yes	yes
Super Critical Water Oxidation	yes	?	Yes	yes	yes
Electrochemical oxidation	yes	no	Yes	Yes	yes
Vitrification	no	yes	No	No	no
Ball milling	yes	no	Yes	yes	no
Molten salt	?	?	?	?	?
Molten metal [7]	?	?	?	?	?
Catalytic hydrogenation	yes	no	?	?	yes
Technology	**Non-combustion destruction technology**	**Intrinsic PCDD/F formation**	**Capable of containing all process streams**	**Capable of reprocessing all process streams**	**Demonstrated high DE**
Solvent washing	no	no	N/A	N/A	no
Landfill/burial	no	no	No	N/A	no
Solidification/ stabilization	no	no	No	N/A	no
Land spreading	no	no	No	N/A	no
Deep-well injection	no	no	No	N/A	no

? – indicates information lacking on specific criteria.

[6] Incineration for this summary includes dedicated incinerators, cement kilns, boilers, furnaces, etc. and plasma arc technology

[7] Company recently filed for bankruptcy so not further evaluated

From the initial screening, the following technologies are eliminated, because they are either non-destructive in nature, utilize combustion as the primary means of treating wastes, or are incapable of containing and reprocessing all process streams: landfilling, deep well injection, land spreading, solidification, stabilization, solvent washing, plasma, incineration, cement kilns, boilers, industrial furnaces, plasma based systems, vitrification.

The technologies that meet the initial screening are shown below:

List of technologies that meet initial screening

Technology	Commercial scale	Countries where licensed and/or used for commercial treatment
Gas Phase Chemical Reduction	Full	Australia, Canada, USA, Japan (Argentina?)
Sodium reduction process(es)	Full	France, Germany, UK, Netherlands, South Africa, Australia, USA, Saudi Arabia, Japan, New Zealand
Base Catalysed Dechlorination	Full	Australia, USA, Mexico, Spain, New Zealand
Solvated electron process	Full	USA
Electrochemical oxidation	Limited	USA
Catalytic hydrogenation	Limited	Australia
Super-critical water oxidation	Limited	USA
Ball milling	Limited/demo	Germany
Molten salt	Demo	N/A

Of the remaining technologies two (ball milling and molten salt oxidation) have only been demonstrated at small scales and it is considered that they have not yet been demonstrated at a scale that would enable them to be further considered for the current Project.

Three other technologies (Electrochemical Oxidation, Catalytic Hydrogenation and Super-Critical Water Oxidation) have been licensed and utilized but only at relatively small scales. As such, it is believed that these technologies have not yet reached a sufficient level of commercial maturity to enable further consideration for this work.

Four of the technologies (Gas Phase Chemical Reduction, Base Catalyzed Dechlorination, Sodium Reduction Process and Solvated Electron Process) detailed information on which to enable an assessment of the technology for other POPs wastes, or the suitability of the technology for the current Project has not been obtained through public information sources. Contact has been initiated with vendors seeking this information, but no detailed response has been received at the time of writing.

The Solvated Electron process has been commercialized in the USA where Sodium Reduction Process and the Solvated Electron process have been utilised at commercial scales for the treatment of POPs wastes. Of these, the Sodium Reduction Process has been commercialized for the treatment of PCBs in a number of countries. However, one 10 tonne/day unit began operating in 2001. As such, there are concerns that this technology may not be capable of meeting the Project timetable for implementation.

Base Catalysed Dechlorination systems have been commercially utilised in a number of countries for the treatment of PCB wastes and some other POPs. The process was developed to treat halogenated organic compounds in liquid form. It cannot treat soils or solids directly.

Gas Phase Chemical Reduction appears to be the most commercially mature and developed of the alternative technologies, and has demonstrated a capability of treating all POPs wastes in a manner consistent with the criteria established under the current project.

Based on the information currently available, it is suggested that GPCR, BCD and possibly the Sodium Reduction process should be considered for further detailed evaluation under the current project. However, it must be considered that other technologies may be capable of meeting the suitability criteria for the current project as those technologies are further commercially developed and more detailed information becomes available.

Further evaluation of these alternatives will require more detailed information, including thorough characterisation and analytical data describing the process and analysis of all waste streams. Detailed information is currently only available for the Gas Phase Chemical Reduction and to a lesser extent the Base catalysed dechlorination process. In many cases, it appears detailed evaluations of the true potential destruction efficiency have never been conducted (e.g. sodium reduction of PCBs), as regulators have only required treatment to levels defined by legislation (e.g. PCB levels less than 2ppm, or 0.5 ppm, etc).

Summaries of different potential alternative technologies *(Data were collected in 2001 and for recent information, refer to the TAG reports)*

Gas Phase Chemical Reduction – GPCR Process:

Process: Hydrogen reacts with chlorinated organic compounds, such as PCBs, at high temperatures/low pressure yielding primarily methane and hydrogen chloride.
Efficacy: Demonstrated high destruction efficiencies for PCBs, dioxins/furans (see Appendix 1), HCB, DDT.
Applicability: All POPs – including PCB transformers, capacitors, and oils. Capable of treating high strength POPs wastes.
Emissions: All emissions and residues may be captured for assay and reprocessing if needed. Dioxins/furans have not been detected in the product gas from the process, but have been detected at low levels from natural gas burner used to heat reaction vessel.
Configurations: Modular; transportable and fixed.
Concerns: Use of hydrogen gas, although company has good environmental/regulatory track record. Fate of arsenic/mercury in system. Optional use of afterburner for burning product gas (methane).
Applicability for the current Project: Potentially suitable.
Licensing: Commercially licensed in Australia for POPs wastes since 1996. Recently licensed in Japan for PCBs and dioxin wastes. Has been licensed and used for full-scale remediation project in Canada and pilot scale remediation in USA. Is currently under assessment for US Army Chemical Weapons demilitarisation programme (phase 3).
Vendor(s): ELI Ecologic International, 143 Dennis St., Rockwood, Ontario, Canada N0B 2K0
Phone: (519) 856-9591, Fax: (519) 856-9235. Website: www.eco-logic-intl.com

Sodium Reduction Process:

Process: Reduction of PCBs with dispersed metallic sodium in mineral oil. Has been used widely for in-situ removal of PCBs from active transformers. Products of the process include non-halogenated polybiphenyl, sodium chloride, petroleum based oils and water (pH > 12).
Efficacy: Destruction efficiency of the process has not been demonstrated. However the process has been demonstrated to meet regulatory criteria in EU, USA, Canada, South Africa, Australia, Japan for PCB treatment (eg. in Canada to [PCB] < 2 ppm for treated oil; and [PCB] < 0.5 ppm; [dioxins] < 1 ppb for solid residues).
Applicability: PCBs to 10 000 ppm (also claims of applicability to other POPs, but no data)
Emissions: unknown?
Concerns: Lack of information on characterisation of residues. If used for in-situ treatment of transformer oils then may not destroy all PCBs contained in porous internals of the transformer.
Configurations: Transportable and fixed
Applicability for the current Project: Potentially suitable, but further information required.

Licensing: Widely available worldwide
Vendor(s): many. e.g. Powertech, Vancouver, Canada. website: www.powertechlabs.com

Base Catalyzed Dechlorination:

Process: Described as a non-conventional heterogeneous catalytic hydrogenation process, which reacts organochlorines with an alkali metal hydroxide, a hydrogen donor and a proprietary catalyst to produce salts, water and carbonaceous residue.
Efficacy: High destruction efficiencies have been demonstrated for DDT, PCBs and dioxins/furans in treatability trials.
Applicability: DDT, PCBs, dioxins/furans. The issue on PCB concentration will be discussed.
Emissions: Solid residues may be captured for assay and reprocessing if needed.
Concerns: Solid residues not fully defined. Potential for emissions through pressure relief valve. A fire in unit operating in Melbourne in 1995. Process difficulties in unit operating in Sydney, Australia.
Configurations: Modular; transportable and fixed
Applicability for the current Project: Potentially suitable.
Licensing: Commercially licensed in USA, Australia, Mexico, Japan and Spain.
Vendor(s): Patent holder: BCD Group Inc., Cincinnati, OH 45208, USA, kornel_a@bcdinternational.com Website: www.bcdinternational.com

Solvated electron technology:

Process: Solvated electron solutions are produced by dissolving sodium metal in anhydrous ammonia at room temperature. The solvated electrons reduce POPs wastes metal salts and simple hydrocarbon compounds. e.g. PCBs are reduced to petroleum hydrocarbons, sodium chloride, and sodium amide. Materials with high water content must be de-watered prior to treatment.
Efficacy: High destruction efficiencies have been reported for DDT, dioxins/furans and PCBs.
Applicability: All POPs – including PCB transformers, capacitors, and oils.
Emissions: All emissions and residues may be captured for assay and reprocessing if needed. However no data on dioxin/furan levels in off-gas was identified.
Concerns: Use of anhydrous ammonia and liquid sodium, potential for over-pressurisation. Limited analysis data for off-gases and limited experience at commercial scale.
Configurations: Modular; transportable and fixed
Applicability for the current Project: May be suitable, although limited commercial scale experience and lack of detailed information may preclude further consideration.
Licensing: Commercially licensed for PCB wastes in USA.
Vendor(s): Commodore Applied Technologies Inc., 150 East 58th Street, New York, NY 10155, USA. Phone (212) 308-5800, Fax (212) 753-0731. Website: www.commodore.com

Super-critical water oxidation:

Process: At temperatures and pressures above the critical point of water (374°C and 22.1 MPa) POPs dissolve freely and are treated with an oxidising agent (eg. oxygen or hydrogen peroxide) to produce carbon dioxide, water and hydrochloric acid.
Efficacy: Bench scale testing has demonstrated potential for high destruction efficiency of POPs.
Applicability: all POPs
Emissions: All emissions and residues may be captured for assay and reprocessing if needed.
Concerns: Lack of detailed analytical data on process, residues and emissions. No identified commercial operating experience. Only one demonstration scale plant in operation.
Configurations: Fixed.

Applicability for the current Project: Unlikely to be suitable. As emissions data indicate dioxins may be able to form in the process, and limited commercial operating experience may preclude further consideration of this process.
Licensing: Undergoing trials for US Army chemical weapons demilitarization (Phase 3).
Vendor(s): General Atomics
Website: http://www.ga.com/atg/aps/scwo.html

Mediated electrochemical oxidation:

Process: Two primary processes available commercially, AEA Silver II process which utilises oxidation of POPs with Ag^{2+} ions in solution, and CerOx process which uses Ce^{3+}. Oxidising agents (Ag^{2+} & Ce^{3+}) react with POPs to produce carbon dioxide, neutral salts and dilute acid solution. Both processes operate at low temperature and pressures.
Efficacy: Both technologies have demonstrated high destruction efficiencies in trials
Applicability: all POPs
Emissions: Both systems are capable of containing all process streams.
Concerns: Limited detailed information about residues and process wastes. Only laboratory scale experience with treatment of POPs wastes identified.
Configurations: modular/transportable systems.
Applicability for the current Project: Potentially suitable, but limited operating/commercial experience make technology unlikely to meet project timelines.
Licensing: CerOx is operated in USA (NB. Process does not apparently require licensing under RCRA due to minimal emissions). AEA Silver II process is currently undergoing trials by US Army for chemical weapons demilitarisation.
Vendor(s): AEA Technologies UK, (www.aeat-prodsys.com/prodsys/divisions/OCD.html) and CerOx Corporation, USA (www.cerox.com)

Ball milling:

Process: The POPs wastes are placed in a ball mill with a hydrogen donor compound in the presence of an alkali metal (magnesium, sodium, etc). Reductive dehalogenation occurs due to mechanochemical process yielding, in the case of PCBs reacting with magnesium: biphenyl and magnesium chloride.
Efficacy: limited information. Some testing data suggests may be capable of high DE. Claimed that process can be selective and generates well-defined products.
Applicability: process should be applicable to all POPs wastes
Emissions: ball mill operates as closed batch system, so releases should be contained. No testing data on air releases.
Concerns: The limited information characterising the residues and releases from the process. Extremely limited commercial experience of the processing of POPs wastes.
Configurations: Uses conventional ball milling equipment so should be available in a range of different configurations.
Applicability for the current Project: Unlikely to be suitable in the short term. Further detailed information on the process required.
Licensing: Only trial scale processing/development in Germany.
Vendor(s): Tribochem, Wunstorf, Germany. **Website:** www.tribochem.com

Molten salt oxidation:

Process: POPs wastes are injected into a bath of a molten carbonate salt (typically sodium carbonate) at 900-950 °C, yielding carbon dioxide, sodium chloride, water and nitrogen.
Efficacy: No detailed information about true destruction efficiencies available. High DRE has been reported for chlordane in trials.

Applicability: unknown
Emissions: unknown if releases can be contained in the system.
Concerns: Lack of detailed analytical data. Large volume of salts generated in process requiring disposal.
Configurations: Research scale only
Applicability for the current Project: Unlikely to be suitable
Licensing: n/a
Vendor(s): ? **Website:** ?

Catalytic hydrogenation:

Process: PCBs in transformer oils are hydrogenated by robust sulphide based catalysts, yielding hydrochloric acid and light hydrocarbons.
Efficacy: high destruction efficiencies have been claimed for POPs
Applicability: all POPs?
Emissions: Unknown if all process streams can be contained for testing/further reprocessing.
Concerns: Lack of detailed information on all process streams and residues.
Configurations: Pilot scale – used for a commercial treatment of 3000 litres of PCB oil with concentration < 1000 ppm.
Applicability for the current Project: Unlikely to be suitable in short term. Far more detailed information required for evaluation.
Licensing: Australia
Vendor(s): Commonwealth Industrial Research Organisation (CSIRO), Australia

Selected Bibliography

USEPA (2000) US Environmental Protection Agency. Potential Applicability of Assembled Chemical Weapons Assessment Technologies to RCRA Waste Streams and Contaminated Media, EPA 542-R-00-004, August 2000.

UNEP (2000) UNEP Chemicals. Survey of Currently Available Non-Incineration PCB Destruction Technologies. First Issue, August 2000.

USDOE (1997) W. E. Schwinkendorf, B. C. Musgrave, and R. N. Drake. Evaluation of Alternative Nonflammable Technologies for Destruction of Hazardous Organic Waste. INEL/EXT-97-00123. Idaho National Engineering Laboratory and Lockheed Martin Idaho Technologies Company. Prepared for the U.S. Department of Energy, Under DOE Idaho Operations Office Contract DE-AC07-94ID13223, April 1997.

USDOD (1999) G.O. Bizzigotti et. al. Assessment of ACWA Technologies and Equipment for Treatment of Non-Stockpile Wastes and Chemical Materiel. Mitretek Technical Report, MTR 1999-32V1, prepared for US Department of the Army Programme Manager for Chemical Demilitarization. Contract No.: DAAM01-97-D-0015, May 1999.

UKDTI (2000) REGIONAL FACILITIES FOR DEALING WITH HAZARDOUS WASTE. Prepared by National Engineering Laboratory, East Kilbride, GLASGOW, for UK Department of Trade and Industry Environment Directorate, November 2000.

USDOD (2000) EVALUATION OF NEUTRALENT POST-TREATMENT TECHNOLOGIES FOR THE NON-STOCKPILE CHEMICAL MATERIEL PROGRAMME. Prepared by The Technology Evaluation Panel under Stone & Webster Engineering's Contract with the Programme Manager for Chemical Demilitarization. Contract No.: DAAM-01-96-D-0010, September 2000.

USDOD (2001) US Department of Defence. Assembled Chemical Weapons Assessment Programme. Supplemental Report to Congress, June 2001.

Annex 9: MINUTES OF THE 1st TECHNICAL ADVISORY GROUP (TAG) MEETING

Report of First TAG Meeting
UNDP/UNIDO/GEF Project

The first meetings of the Technical Advisory Group (TAG) of the UNDP/UNIDO GEF project on alternatives to combustion technologies was held in Vienna, Austria on October 17, 2001.

The meeting considered an Overview Paper prepared in advance of the meeting based primarily on information that is freely available in the public realm from sources such as the United States Environment Protection Agency (USEPA), United Nations Environment Programme (UNEP), US Department of Energy (USDOE), NATO Committee on Challenges in Modern Society (CCMS), and freely available information from Technology Vendors.

The paper surveyed a range of destruction and disposal technologies, and it identified nine of them that might be consistent with criteria contained in the GEF approved PDF-B.

The meeting interpreted the requirement in the PDF-B that the technology be "commercially available" to mean that the technology has already been successfully operated in a full scale, commercial (or other institutional) setting; and that a vendor or vendors are available who can provide not only the technology itself, but also can provide the know-how and support needed to successfully set up and operate the technology under circumstances such as those likely to be encountered in the Philippines and/or Slovakia.

On the basis of these screening criteria, the meeting further reduced the number of technologies still under consideration for deployment under this project to a list of three:

1. Gas Phase Chemical Reduction
2. Base Catalyzed Dechlorination
3. Sodium Reduction Process

The meeting considered a detailed presentation of the Gas Phase Chemical Reduction technology, and it found the presentation extremely useful in assisting the TAG to evaluate this technology in relation to the needs of the respective countries (Philippines/Slovakia). There was broad agreement that this technology should be able to meet both the technical selection criteria contained in the PDF B, and should also be able to meet the requirement of "commercial availability" as this requirement was interpreted by the TAG.

Less detailed information was available to the meeting on Base Catalyzed Dechlorination, and on the Sodium Reduction Process. The meeting requested that more detailed information on these be made available to the TAG. It was agreed that a similar body of information on Base Catalyzed Dechlorination be made available to the TAG for review and comment by mid-December, it all possible.

The meeting felt it did not posses the information to conclude whether or not the Sodium Reduction Process had the capability to address the contaminant that has been targeted under this project: PCBs, including highly concentrated PCBs. It was agreed that this would be explored.

It was agreed that if an initial determination was made concluding that the Sodium Reduction Process had this capability, and if it appears this technology could be used to ensure, what the meeting called a "cradle to grave" approach in addressing the targeted contaminant (PCB), then a detailed presentation of this technology would also be prepared to be shared with members of the TAG for review and comment. Again, a mid-December date was proposed for the completion of this work.

It was agreed that meeting Overview Paper was generally well prepared, but would be edited to reflect more clearly that candidate technologies for application during project implementation were initially chosen consistent with criteria spelled out in the PDF B.

It was further agreed that a new draft of the Overview Paper would be available for circulation in the first part of December.

Technical Advisory Group (TAG) meeting on POPs Non-combustion technology
17 October 2001, Vienna, Austria

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Annex 9a: MINUTES OF THE 2ND TECHNICAL ADVISORY GROUP MEETING

2nd meeting of the Technical Advisory Group
Manila, The Philippines, 25th and 26th September 2003

Meeting Report

Opening and welcome

The meeting opened at 09:50 with Mr. Andy Hudson, UNDP, in the Chair.
Mr. Rolando Metin, Undersecretary for Management and Technical Services of the Department of Environment and Natural Resources, Government of the Philippines, welcomed delegates to the meeting on behalf of State Secretary Gozun.
Mr. Geoffrey Mariki, Chief of the POPs unit within UNIDO, responded by thanking, through Undersecretary Metin, State Secretary Gozun and her DENR colleagues for their continued support for the Non-combustion programme and its activities in the Philippines; and for their assistance and hospitality in organising and hosting this second meeting of the Technical Advisory Group.

Adoption of provisional agenda

The provisional agenda was ***adopted***.

Progress of the non-combustion programme; role of the TAG

The TAG ***noted*** paper 02.02 setting out a brief description of the progress of the programme and ***invited*** UNIDO to present programme activities and future plans.

Mr. Mariki set out the need to develop environmentally sound alternative technologies to existing destruction and disposal methods that did not meet the obligations of the Stockholm Convention and gave rise to widespread public concern. He presented a brief history of the UNIDO non-combustion programme to address perceived barriers to wider take up of these technologies and reported the approval of the first country project and programme proposal at the GEF Council meeting in May 2003. He noted the review comments provided by Council members and the work now going on to address those comments in the project document for submission to the GEF CEO. He set out a brief forward look for the programme with the planned submission of a project brief for the Philippines country project for the GEF inter-sessional meeting in January, with project briefs for China and a country in Africa during 2004.

Terms of Reference and technology selection criteria

The TAG ***reviewed*** its Terms of Reference prepared for the first TAG meeting (given in NC/TAG/02.03 Annex 1) and ***determined*** that they remain suitable.

The TAG ***reviewed*** the technology overview and project selection criteria, prepared for the first TAG meeting (given in NC/TAG/02.03 Annex 2) and ***confirmed*** that these criteria remain appropriate to the Programme subject to the following amendment.

The third criterion – that the technology should be 'commercially available' be amended to 'commercially available for technology transfer'.

Further, the TAG ***concluded*** that a series of indicators, reflecting the objectives of the Stockholm Convention and other international agreements, were required for the assessment and evaluation of technologies against

the selection criteria at the programme level but that, for any given country project, the final selection of a technology would also require detailed consideration of the wastes to be destroyed.

The TAG ***determined*** that these indicators might usefully distinguish between technology performance (a) in dealing with different POPs and POPs matrices; (b) at different stages within the overall destruction system; and (c) under commercial conditions and scales likely to be encountered in developing and transition economy countries.

The TAG ***noted*** the continuing work of the Open-Ended Working Group (OEWG) of the Basel Convention to develop guidance in relation to POPs wastes and ***recommended*** close collaboration between the TAG and the OEWG.

It was ***agreed*** that the secretariat would develop a draft paper on indicators for circulation to the TAG following the submission to the secretariat of suggested indicators by TAG members.

Commercially available technologies: Responses from Technology providers

The TAG ***noted*** reviews and correspondence prepared by TAG members and related to technologies short listed, or recognized as potentially meeting project criteria at TAG1, and included in NC/TAG/02.Inf 4.

The TAG ***noted*** document NC/TAG/02.Inf 5 setting out (a) the Secretariat's letter to five commercial entities seeking structured information of the non-combustion technologies they provide for the destructions of POPs; (b) the responses from 4 technologies providers – ABB Transformatoren GmbH, BCD Group Inc., ELI Ecologic International, and Toshiba Corporation; and (c) the lack of response from Commodore Applied Technologies in relation to the Solvated Electron Process.

The TAG ***welcomed*** the positive responses from technology providers and ***thanked*** them for the keen interest they display in meeting the requirements of the non-combustion programme and the wider needs of developing and transition economy countries.

Presentations from technology providers

The TAG ***received*** presentations, in alphabetic order by company, from ABB Transformatoren GmbH, BCD Group Inc., ELI Ecologic International.

The TAG ***received*** apologies from Toshiba Corporation that it was unable to make a presentation.

The presentation from ABB Transformatoren GmbH highlighted the ***LTR^2 (Low Temperature Rinsing and Re-use)*** system that marries ABB's considerable experience in transformer maintenance and recycling (used commercially for more than 15 years on over 30 000 transformers to date) with Sodium Reduction (NaR) technology for the non-combustion destruction of PCBs and mineral oils contaminated with PCBs.

ABB Transformatoren GmbH reported the principal advantages of its system as:

- the factoring-in of costs for new or recycled equipment for the equipment owner;
- its operation at low temperatures and pressures minimizing attendance risks and input costs;
- its ability to work with low-contaminated transformers *in situ;*
- the use of an effective solvent (tetrachloroethylene) to rinse PCBs from highly contaminated transformers;
- the mobility and scalability of the NaR technology.

BCD Group reported development of the ***Base Catalysed Decomposition (BCD)*** technology to provide a mechanically and chemically simple process that was considered safe to operate and represented a low-cost destruction option. An improved and proprietary reaction accelerator and the use of mechanical stirring were cited as important considerations in recent improvements in performance and reductions in operational costs. Recent plants commissioned in Mexico and Japan handled PCBs liquids and POPs solids such as pesticide powders and pellets. Pre-treatment and size reduction was requirement for transformers and other solids. Pre-

treatment regimes could include, for example, thermal desorption apparatus to extracts POPs 'liquors' from contaminated soils.

ELI Ecologic International reported the principal advantage of its ***Gas-Phase Chemical Reduction (GPCR)*** system as providing a complete destruction solution - combining licensing, engineering and technology transfer to deal with a wide variety of halogenated materials. The system utilizes a reduction-based chemical approach that does not create heavy molecules. Pre-treatment elements (varying according to matrix) facilitate the release of matrix organics to the gas phase for destruction. The use of a Thermal Reduction Batch Processor (TRBP) that can accommodate up to 15 $t.batch^{-1}$ minimizes the size reduction and handling necessary in dealing with contaminated solid components. Destruction is achieved at high temperature in the gas phase through the introduction of hydrogen.

Discussion of technologies and recommendations

The TAG ***invited*** Mr. N Harjee to report on his visit to evaluate BCD technology at a modern plant in Mexico (NC/TAG/02.Inf 6). Mr. Harjee reported that:

- the plant had been operating for 7 years but modifications in the last 3 years had considerably improved its performance;
- the technology handled only PCBs liquids arising from the solvent washing and dismantling of transformers and capacitors;
- plant capacity was approximately 3 000 $l.d^{-1}$ and resulted in about 7 000 $l.d^{-1}$ of oil with ≤ 4 ppm PCBs;
- the plant had provided amongst the lowest tender prices for PCBs destruction and was contracted by Government at US$ 2.3 – 2.76 kg^{-1} depending on the PCBs concentration of the wastes; and
- the plant appeared simple to operate, was essentially closed with on-line sampling and QC (but no monitoring of gaseous releases?), and with external performance auditing for which data was available.

In discussion, the TAG sought clarification regarding the nature of the large volume of oil resulting from the process. The use of a 'donor' mineral oil as an input was noted. If this remained unchanged during reaction then presumably it could be recycled, however, if it was chemically transformed during reaction, its final composition needs to be known.

Furthermore, the TAG questioned quoted destruction efficiencies, as it was not clear that these considered all process outputs. There was concern that the chemical reactions were not fully characterised and may be complex, resulting in some reactions not reaching completion and giving rise to chemicals of concern in releases that were not fully tested.

The TAG ***noted*** the presentation setting out Australian experiences in the management of scheduled wastes (NC/TAG/02.Inf 7) and ***thanked*** Mr. T. Bridle for submitting it.

The TAG ***invited*** Mr. J Skaarup to report on the work undertaking by COWI on behalf of DANCEE to review POPs elimination technologies (NC/TAG/02.Inf 8). Mr. Skaarup reported that the review:

- considered both incineration and non-combustion technologies within the context of regulatory, cultural, technical and economic conditions prevalent in CEE;
- concluded that GPCR technology was highly reliable with commercial appeal and immediate market availability but with high operational expenditures
- concluded that BCD technology as developed in Australia was of limited capacity, lacked documentation of handling of residues and was less cost effective than some other systems[8];

[8] BCD technology was reviewed at an operating plant in Australia. There may be engineering and performance differences between this plant and other operations employing BCD technology.

In discussion, the TAG noted the close grouping of 'final scores' with GPCR and the incineration systems all scoring essentially the same. This was felt to be a difficulty in reducing complex multivariate data to a simple assessment system. While all the systems might meet existing regulatory systems it was not clear that they would be compatible with the Stockholm Convention.

The TAG ***welcomed*** the approach taken by ABB, in developing the ***LTR²*** system, to recycle and re-use as much of the equipment as possible so as to reduce the overall costs of removing and destroying PCBs wastes.

The TAG ***considered*** that the system might meet programme criteria for technology selection but that further information was required to assess this in detail.

Following questions to the technology provider, the TAG ***requested*** the secretariat to gather from ABB, and circulate to TAG members, information on the following topics:

- the nature and volume of organic by-products and the disposal methods used;
- the risks of fugitive releases, particularly during solvent washing, and measures taken to counter them;
- 3rd party validated performance data from commercial operation of the system;
- ABB's experience and performance in the treatment of contaminated soils;
- the quantities of solvent used and measures taken to avoid its release; and
- the risks related to all inputs, including the use of sodium metal, and an assessment of the replicability of the system to developing and transition economy countries.

The TAG ***welcomed*** the latest advances in the BCD technology reported by the BCD Group and ***considered*** that the system might meet programme criteria for technology selection but that further information was required to assess this in detail, particularly as various plants around the world had been engineered independently and operated in different ways.

The TAG ***noted*** the use of a proprietary 'reaction accelerant' that appeared to be consumed in the reaction and was thus not a conventional catalyst.

Following questions to the technology provider, the TAG ***requested*** the secretariat to gather from BCD Group, and circulate to TAG members, information on the following topics:

- chemical characterization and details of reactions;
- the quantities of mineral oils used in pre-treatment and destruction phases of the system, and the use or disposal of residues from this material;
- materials balance including all inputs and reaction products;
- details assessment of destruction efficiencies taking into account all releases and products;
- the nature of systems required to ensure no releases of contaminated material via reaction products – including chemical water and salt
- the risks of forming and releasing other chemicals of concern not yet included in monitoring regimes; and
- breakdown of costs estimates and clarification of whether pre-treatment and waste streams monitoring and treatment were included in costs provided.

The TAG ***welcomed*** the latest advances in the GPCR technology reported by ELI Ecologic International and the degree of independent reporting and data related to commercial operations provided in the submission.

The TAG ***questioned*** the technology provider in relation to (a) the monitoring of outputs and verification of reaction completion; (b) pre-treatment systems and costs; (c) risks associated with the use of hydrogen; (d) scalability of the technology; (e) the economics of high-temperature, gas-based destruction; and (f) the availability of the system for technology transfer.

ELI Ecologic provided the following responses:

Outputs monitoring and verification: *Gas streams* are monitored continuously for monochlorobenzene as an indicator of incomplete reaction, monitoring is supported by periodic direct laboratory analysis of gas products. Contaminated *solid components* are wipe tested after treatment to ensure compliance. *Water* is filtered then tested on site prior to release. *Carbon filters* are cleansed and reactivated in the GPCR system. Monitoring costs are incorporated as part of the technology package and form a component of the standard operating system and procedures.

The Pre-treatment system has been designed to (i) minimize handling and size reduction necessary, (ii) maximize release of target organics from contaminated equipment. Proprietary systems are used, for example, in generating 'liquors' from contaminated soils. Other approaches, such as solvent washing, could be incorporated to meet customer demands and would alter capital and operating cost structure.

Hydrogen is an industrial gas commonly used in industry and a basic component of petrochemical sector chemistry. Recommendations of a 3rd party risk assessment of GPCR have been incorporated in their entirety. The system has demonstrated approximately 30 000 hours of safe operation. Continuous monitoring and automatic shutdown devices are part of standard operating systems and procedures.

The scalability of the technology relates directly to commercial viability. Capital and operating costs are not linear; a 100 $t.y^{-1}$ plant would have capital costs representing 25% of a 1000 $t.y^{-1}$ plant. Pretreatment and ancillary equipment costs would also not be linearly related.

Economic viability is demonstrated by the commercial take up of the technology – those that are not viable do not survive. Assuming a 'level playing field', relating to the control of all releases and all costs, then destruction via GPCR can be provided at costs equivalent to those of incineration. Unfortunately, current performance and costing regimes favour incineration.

The Technology is transferred as a package to the purchaser comprising licensing, design, engineering, pretesting, construction, performance testing and permitting, operating procedures, training and internet-based remote monitoring.

The TAG considered the technology [likely] to meet the selection criteria and ***requested*** the secretariat to include the presentation from ELI Ecologic International in the meeting papers.

The TAG ***welcomed*** the submission by Toshiba Corporation of its innovative approach to non-combustion destruction combining ultra-violet irradiation and catalytic dechlorination (UVCD) technology.

The TAG ***considered*** that the Toshiba submission indicated that the technology was not yet commercially available and looked forward to its continued development and validation under conditions of commercial operation.

The TAG ***requested*** the secretariat to write to all the technology providers thanking them for the information and presentation they had provided and for their continued interest to develop non-combustion technologies for POPs destruction appropriate to the needs of developing and transition economy countries.

The status of PCBs and other POPs in the Philippines

Mr. J. Amador, Director of the Environment Management Bureau of the Department of Environment and Natural Resources gave a presentation setting out the progress made by the Philippines to date in controlling hazardous chemicals within the context of the Toxic substances, Hazardous and Nuclear Waste Control Act (1990; RA6969), and its attendant implementing rules and regulations, and the draft Chemical Control Order (NC/TAG/02.Inf 9).

He set out the priorities for the country as follows:

- enacting the Chemical Control Order
- supporting the implementation of the Non-combustion project to destroy the POPs burden in the Philippines
- preparing PCBs management plans and gaining assistance for such plans at utility and enterprise levels
- reiterating the ban on imports of hazardous wastes, including POPs wastes

- raising awareness of officials engaged in technology procurement and customs to avoid the unwitting importation of hazardous materials.

Mrs. A. Brabante, Chief of the Chemicals Management Section, presented the status of POPs chemicals in the Philippines as follows:

Endrin: banned in the Philippines, 1983
Aldrin, *dieldrin, heptachlor and toxaphene*: banned in the Philippines, 1989, wastes of some may still exist
Chlordane: banned in the Philippines, 1999
DDT: restricted to disease vector control since 1978, use banned by Dept of Health in 1992
Mirex: never registered and no documented use in the Philippines
Hexachlorobenzene: never registered; import, manufacture and use banned
PCBs: present in electrical equipment; wastes regulated under Republic Act 6969 and subject of the draft Chemical Control Order.
Dioxins & furans: considered within the remit of the Clean Air Act

She reported relevant laws and regulations as PD1144, which created the Fertilizers and Pesticides Authority (FPA) with regulatory powers; RA6969 – Toxic Substances, Hazardous and Nuclear Wastes Control Act; and RA8749 The Philippine Clean Air Act.

Further, she reported that while national inventory work on POPs was only just beginning as part of the enabling activities funded by the GEF, an early inventory, conducted by Dr. Silverio for UNIDO, had identified almost 1000 t of PCBs equipment containing over 200 t of PCBs (NC/TAG/02.Inf 10). [She anticipated a likely national POPs burden of the order of 10 000 t].

Dr. Silverio noted the partial nature of his inventory that, for some categories, provides only an indication that PCBs equipment is in use.

A UNIDO commentary to Dr. Silverio's inventory (NC/TAG/02.Inf 11) noted the careful attention to detail of that work. The commentary provides further indications of where so far un-accounted materials might reside but also identifies POPs source categories where anecdotal evidence may overestimate the POPS wastes that might arise.

The TAG ***considered*** that the development of well-constrained estimates of the POPs burden, and its form, were essential for good business planning for the non-combustion country project. While that business model should seek to demonstrate long-term commercial viability, it is recognised that it would likely be based on best estimates of quantities of different materials. Different confidence limits might apply to each of these estimates. While PCBs represents the principal or initial priority, business planning should consider the wider burden of POPs materials that may be present in the country.

The TAG ***recognised*** the continuing process of developing national inventories and ***considered*** that business planning could not wait for the completion of the enabling activities inventory work.

Mr. Amador reported agreement with the principal electric utility entities to provide further information on their holdings of PCBs, PCBs-containing equipment and PCBs contaminated oils ahead of the Project Steering Committee meeting to be held during the week beginning 20 October.

Matching available technologies to the real problem in the Philippines

The TAG ***recommended*** that, in preparing for final technology selection, the Project Steering Committee should consider:

- the flexibility of any destruction system to deal with the range of POPs and POPs matrices likely to be encountered in the Philippines – and possibly other materials exhibiting POPs characteristics, or giving rise to wastes or releases exhibiting POPs characteristics;
- the commercial viability of any destruction system, taking into account both its capital and operating costs in providing a service meeting local market needs; and

- the transferability of any destruction system, taking into account the range of services – licensing, engineering, training, compliance testing etc., available from the technology provider.

The TAG ***considered*** that final selection should be based on the consideration of submissions from technology providers in response to a published detailed specification prepared by the Project Steering Committee. Such a specification would need to consider both the programme criteria and related indicators, and the nature of the wastes to the destroyed in the Philippines. It would also need to provide guidance on local costs – for example, unit charges for inputs, and an explicit statement of how any prequalification or tendering exercises would be assessed.

The TAG ***recognised*** that final technology selection via a formal tender exercise and contracting exercise could only take place after GEF CEO approval of the Project Document when funds had been transferred to UNIDO.

The following possible process was outlined:

- the Project Steering Committee meeting in late October to considered assessments of the waste materials to be destroyed in order to build an outline business model;
- the Project Brief to contain (i) an outline business model comprising advice from the TAG concerning the technology and an appraisal of the waste materials to be destroyed in the Philippines; and (ii) criteria and indicators for a prequalification exercise;
- a prequalification exercise amongst technology providers recognised as likely to meet the technology selection criteria of the programme and based on the outline business model;
- the Project Document to contain (i) a detailed technical specification of the services to be required in the country project; (ii) a shortlist of technology providers considered to have prequalified; and (iii) an explicit statement of how the tendering exercise would be assessed; and
- a competitive tendering exercise following approval of the Project Document, conducted according to UNIDO procurement rules and amongst prequalifying providers using the technical specification and assessment procedure included in the project document. Where possible the technical evaluation of the tenders to include representatives of the Project Steering Committee.

The TAG ***noted*** the requirement, set by the GEF, for firm co-financing commitments to be submitted with the project brief. This was ***recognised*** as incompatible with a competitive tender exercise at the start of the full country project. The TAG ***considered*** that firm commitments would be unlikely to arise before detailed costs were known.

The TAG ***requested*** UNDP, as Implementing Agency for the programme, to approach the GEF Secretariat to assist in formulating an acceptable procedure to take the country project forward, given the need to maintain the open and transparent process of technology selection.

The TAG ***requested*** UNIDO, as Executing Agency for the programme, to provide advice to the next meeting of the Project Steering Committee on its procurement procedures as these would govern the final technology selection based on a contracting exercise.

Applicability of non-combustion technologies to different situations in developing countries

The TAG ***considered*** that the approaches and findings from the different country projects of the non-combustion programme would prove valuable for many developing country Parties to the Stockholm Convention. While the TAG considered the programme not yet sufficiently advanced to consider a formal publication, it ***recommended*** the establishment by UNIDO of a web-based information resource. This could be done on approval of the Project Document for the non-combustion programme and the first (Slovakia) country project.

The TAG ***recommended*** that its meetings should continue as part of the global programme.

Further, the TAG ***recommended*** that an e-group be established by UNIDO to allow consultation amongst the group between the formal meetings.

The TAG ***requested*** that its papers and summary meeting reports be made widely available, perhaps on dedicated public 'pages' of the UNIDO website. The TAG ***requested*** that information submitted by the technology providers should be included, subject to their permission to publish.

Any other business
GEF STAP meeting on Non-combustion technologies, (1-3 October, Washington DC); The TAG expressed disappointment at the lack of contact with the STAP group and ***requested*** that the summary report of this meeting be forwarded via the UNIDO representative to the meeting (Mr. Z. Csizer).

Closure
On behalf of the TAG, Mr Andy Hudson ***thanked*** the DENR-EMB and the Philippines Government, for their continuing commitment to the non-combustion programme and for their considerable efforts and hard work in preparing for the TAG meeting; the local UNIDO and UNDP offices for their logistical support for the meeting; and the technology providers for their detailed submissions, the presentations to the meeting, and their willingness to participate fully in the meeting.

On behalf of DENR-EMB and the Philippines Government, Mrs. A. Brabante, thanked the international TAG members for travelling to Manila for the meeting and for their advice and support in moving forward with the non-com programme and its Philippines country project Mr. A. Hudson declared the meeting closed at 16:45.

Annex 10: MONITORING OF PCB CONTAMINATION AT CHEMKO CORPORATION AND ITS VICINITY (MICHALOVCE DISTRICT)

Fig 1. PCB Concentrations in Soil (Vicinity of Chemko disposal sites and agricultural fields)

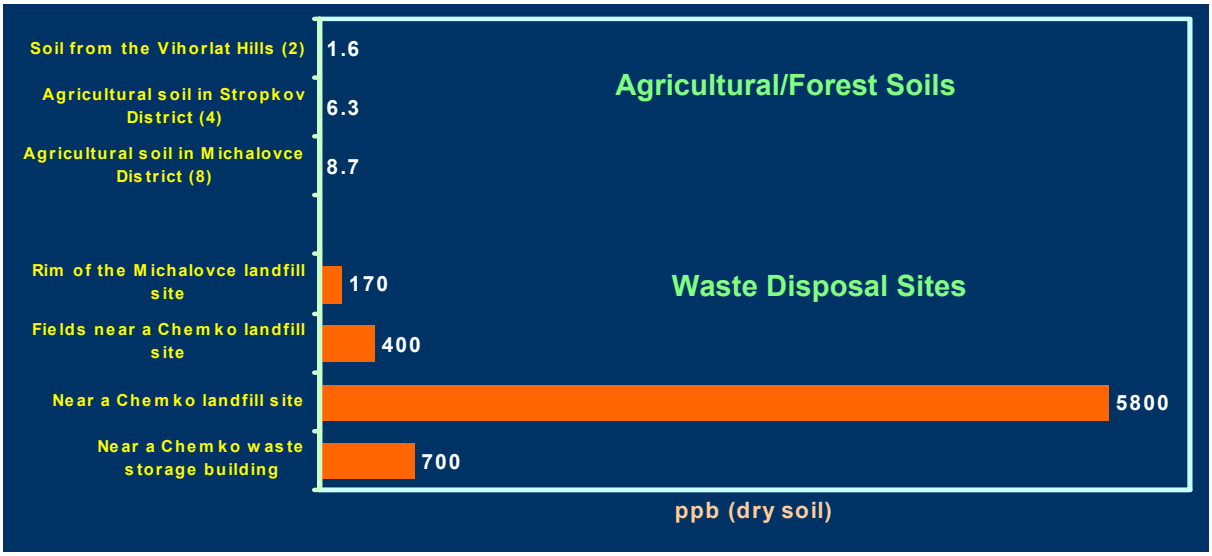


Fig. 2 PCB Concentrations in Contaminated Soils (Waste disposal sites & asphalt-gravel mixing)

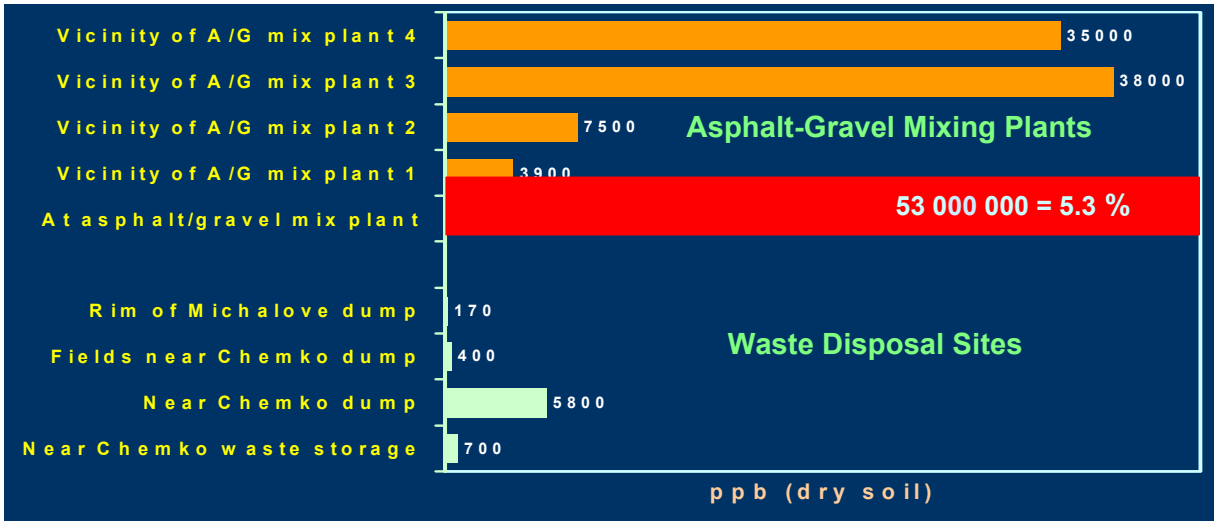


Fig 3: PCB Levels in Sediment Samples : Michalovce (polluted district) vs Stropkov (control district)

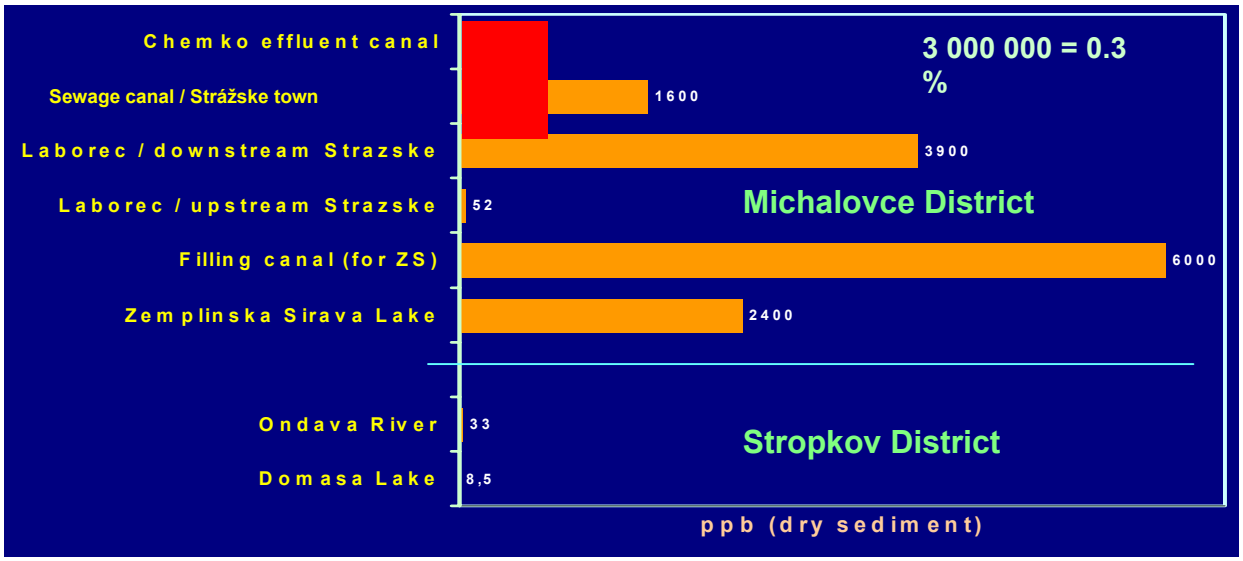


Fig 4: PCB Levels in Fish : Michalovce (polluted district) vs. Stropkov (control district)

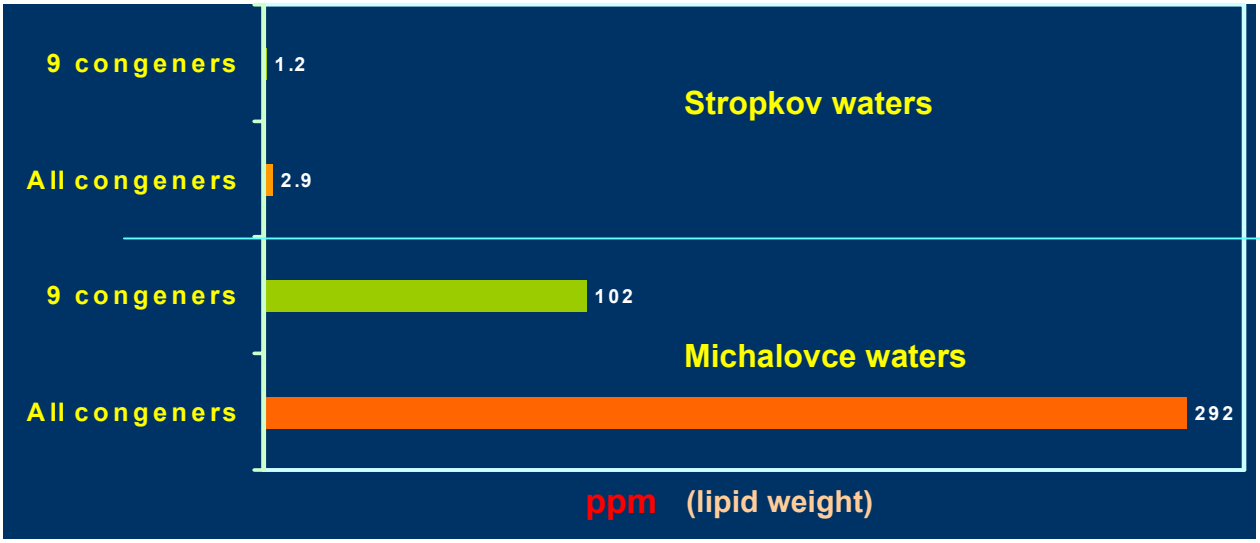


Fig 5: PCB Levels in Game : Michalovce (polluted district) vs. Stropkov (control district)

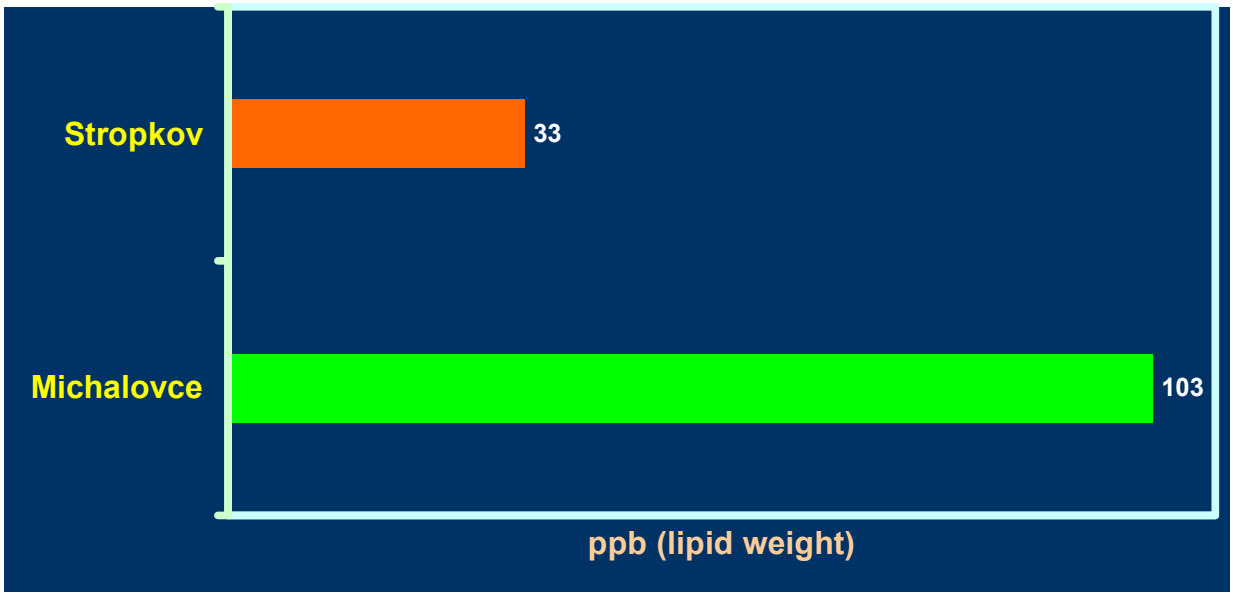


Fig 6: PCB, HCB a pp'-DDE levels in human blood samples (Michalovce and Stropkov

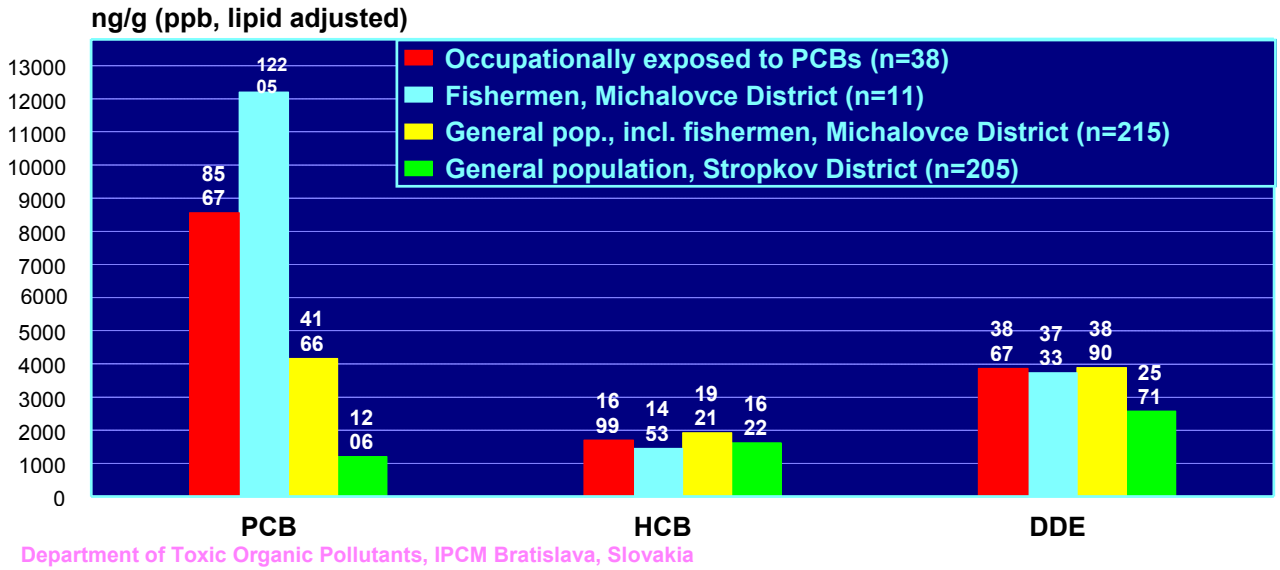
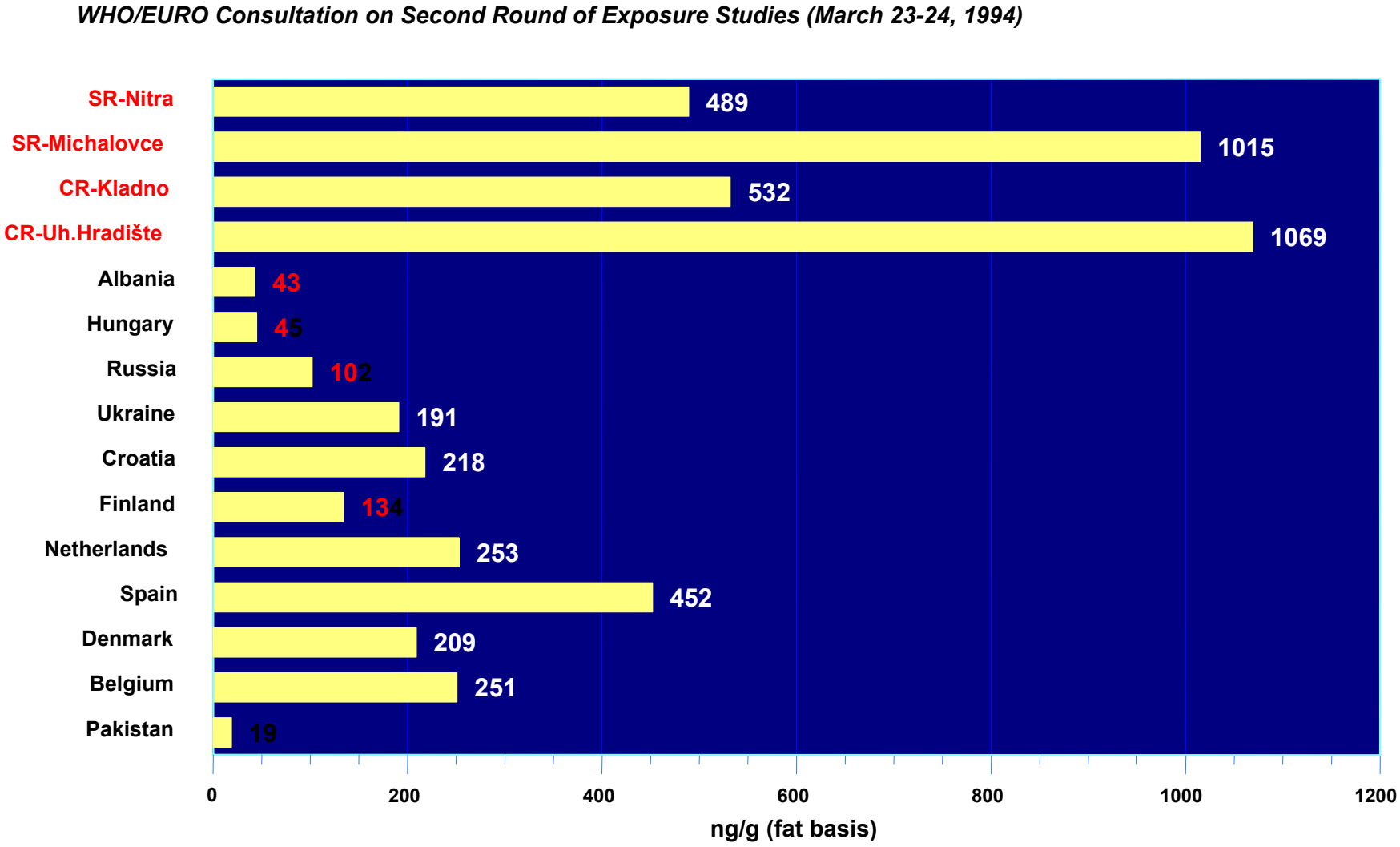
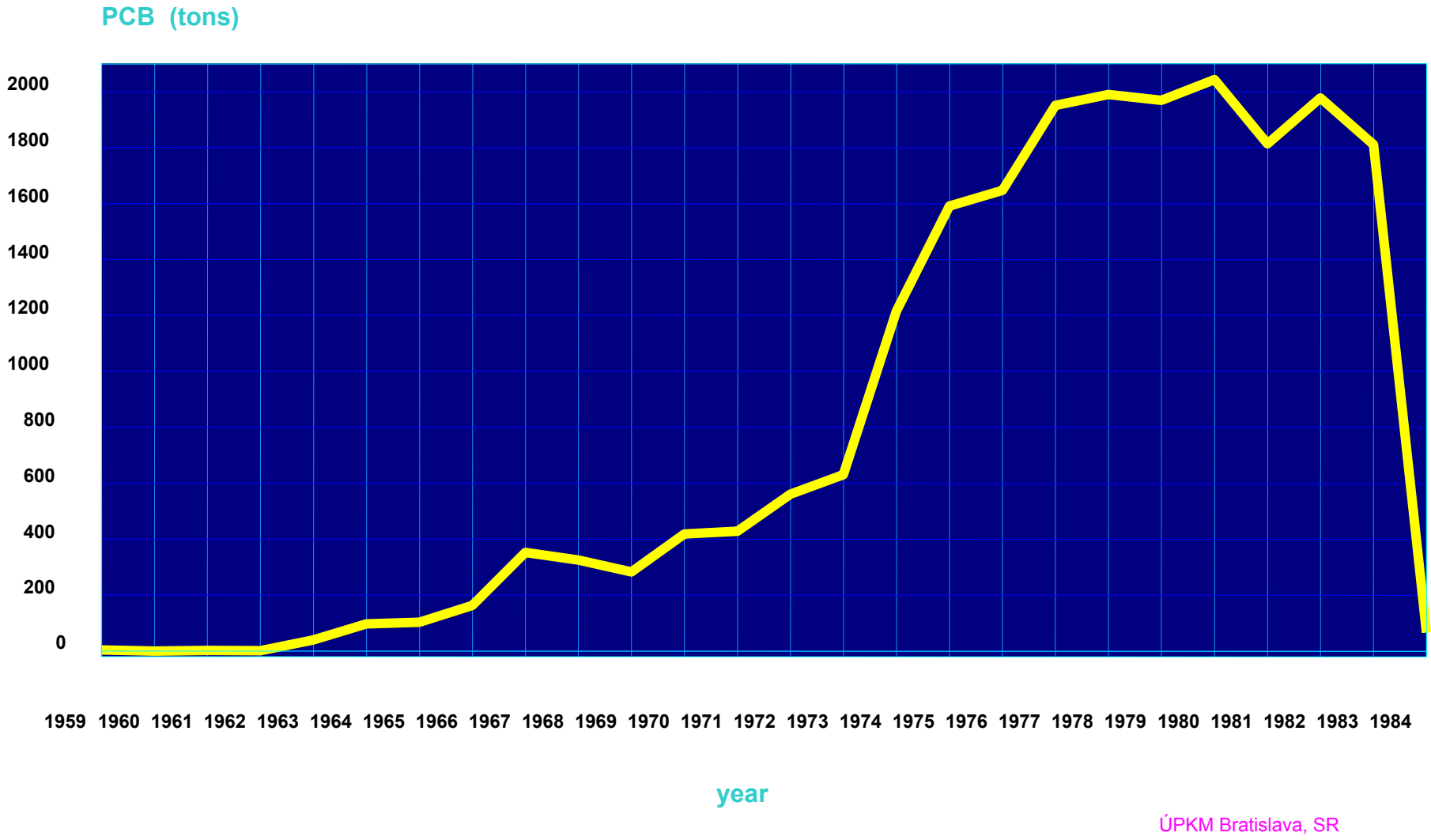


Fig 7: Levels of PCBs (Sum of PCB-28, 52, 101, 138, 153 and 180 levels) in Human Milk Samples from various countries (1993)



Annex 11: PRODUCTION OF PCB IN THE SLOVAK REPUBLIC (1959 – 1984)



ÚPKM Bratislava, SR

Annex 12: ENVIRONMENTAL MONITORING BY CHEMICAL ANALYSIS

The costs of chemical analysis of environmental samples in the vicinity of Chemko Corporation are substantial. According to the experience gained by the national Reference Centre for Dioxins and Related Compounds, Institute of Preventive and Clinical Medicine, Bratislava the cost of analysis for a soil or sediment samples are about US$ 90 for PCBs by isotope dilution high resolution gas chromatography/ low resolution mass spectrometry (HRGC/LRMS) and US$ 800 for PCDDs/PCDFs by isotope dilution high resolution gas chromatography/ high resolution mass spectrometry (HRGC/HRMS) per sample. If large sample series (tens of samples) were analysed, the sample cost for dioxins (PCDDs/PCDFs) might be reduced to US$ 600.

Number of environmental samples to be taken:

- At least 30 upper-layer soil samples should be taken inside the Chemko factory area (in the vicinity of store buildings, former site of PCB production, landfill sites;
- At least 20 sediment samples from the effluent canal (including samples from various depths for vertical distribution);
- At least 15 sediment samples from Laborec River (including some samples collected upstream Strážske);
- At least 20 sediment samples from Zemplinska Sirava (including several samples from various depths for vertical distribution); and
- After the clean-up process: the same number of samples from all sites.

The total number of samples, based on the above, is at least 170 samples.

The cost estimates for the PCB samples are US$ 15,300 and for the PCDDs/PCDFs samples are US$ 102,000.

The total cost of environmental monitoring by chemical analysis would be approximately US$ 117,300.

Annex 13: NGO'S INVOLVEMENT IN PREPARING THE PROJECT BRIEF FOR THE SLOVAK REPUBLIC

The original concept for this project was proposed to UNDP and to UNIDO by an NGO, the Environmental Health Fund (EHF) in early 2000, at a time when the Stockholm Convention was still being negotiated. EHF, a founding member of the International POPs Elimination Network (IPEN), prepared the original concept in close consultation and collaboration with colleagues from several NGOs participating in IPEN. These included international NGOs such as Greenpeace International; and national NGOs from many countries, including NGOs from both Slovakia and the Philippines.

Information about the serious PCB contamination problem in Eastern Slovakia had been presented at several IPEN meetings held in the margins of POPs Intergovernmental Negotiating Committee meetings (INCs). A detailed discussion of this problem took place during the IPEN meeting in Bonn Germany, March 2000, held in the margins of the POPs INC4. Information about serious PCB contamination surrounding the factory in Eastern Slovakia, Chemko Strázske, was provided to IPEN by the NGO, Otvoreny Kruh, whose office is in Bratislava.

Based on this information, EHF proposed to UNIDO and UNDP that Eastern Slovakia might be a good site for the Non Combustion POPs Destruction Demonstration Project then being considered. This proposal was confirmed in discussions with UNIDO, then discussed and reconfirmed in a meeting in Bratislava in June 2000 between Mr. Jack Weinberg of EHF and representatives of Otvoreny Kruh, including Mrs. Alena Pilvanova.

Subsequently, EHF requested Central European NGO colleagues to identify NGOs based in Eastern Slovakia who might have strong interest and involvement in issues relating to Persistent Organic Pollutants (POPs). Spolocnost Priatelov Zeme (Earth Friends Society) was identified as being most critically important. Additionally, SPZ was noted to have a long history of active opposition to waste incineration. The leader of SPZ is Mr. Laco Hegyi. The organization is located in the city of Kosice, which is in a neighbouring district to Michalovce, the district where the factory, Chemko Strázske, the holder of 1000 tonnes of PCB waste.

Mr. Weinberg, representing the team preparing the Project proposal, began email correspondence with Mr. Hegyi in September 2000 and visited him and his organization in Kosice for the first time in November 2000. Mr. Weinberg met at the same time with representatives of other NGOs and civil society organizations located in Eastern Slovakia, and he explained the proposed project to them. Based on these consultations, it was agreed that there existed NGO support for this Project in Eastern Slovakia; and it was agreed that Mr. Hegyi would be a primary point of contact.

These meetings pre-date the completion of the Project PDF B proposal. National and regional NGO interest in, and support for this undertaking was a factor considered in the finalization of the PDF-B proposal for selection of a project site in Eastern Slovakia.

On March 2-4, 2001, Mr. Weinberg participated in a Central European NGO workshop held in the town of Modra, in Slovakia. This workshop was organized by SPZ, on behalf of Central and Eastern European NGOs interested in the topic of POPs Elimination. NGOs attending the workshop came from Slovakia, the Czech Republic, Poland, Ukraine, Belarus and Bulgaria. The Project was discussed and received strong support, thus providing an initial regional constituency for the overall objective of the Project.

The workshop included a discussion of Non-Combustion alternatives for destruction of POPs, and a Greenpeace presentation by Ms. Pat Costner on NGO-supported criteria for selecting appropriate POPs destruction technologies. Mr. Weinberg presented the proposed Project.

The first Michalovce public hearing on the Project took place on October 15, 2001. Mr. Weinberg attended the hearing and spoke on the role of NGOs in the initiation of the proposed project. Mr. Laco Hegyi, representing SPZ, also attended. He made a rather lengthy presentation to the meeting outlining NGO-

supported criteria for the selection of appropriate technologies for POPs destruction. The criteria he presented closely matched criteria stated in the project PDF-B proposal.

In July, 2001, IPEN was approached by the international NGO Earth Council with a request for assistance in the production of a film on Human and Ecological Security it was preparing for international broadcast in the lead up to WSSD. Earth Council requested from IPEN "an example of a particular community/NGO which has taken proactive steps to respond to a POPs threat and inspired other communities."

The film producers were introduced to the Slovakian Government manager for the Non-Com Project, and to the Slovakian NGO, Otvoreny Kruh. Both agreed to participate in a film segment on PCB contamination in Eastern Slovakia showing the role of NGOs in promoting a positive solution. The film, Quiet Revolution, narrated by Meryl Streep, presents the Non-Com Project and its support by NGOs and civil society in a very positive light. In May 2002, Quiet Revolution was entered in the 8th International ENVIROFILM festival held at Zvolen Castle in Central Slovakia. It won the award: "Best Presentation of a Witness on Ecological Problems in Different Parts of the World" from among over 100 films submitted.

Starting in 2002, increased Slovakian NGO concern and engagement on issues of POPs emerged, especially interest and support for PCBs destruction and cleanup based on non-combustion technologies such as those being considered by the Project. Three Slovakian NGOs, Otvoreny Kruh, Spolocnost Priatelov Zeme and Greenpeace Slovakia created an informal group to promote the Project concept and to increase public awareness. Otvoreny Kruh and Spolocnost Priatelov Zeme published and distributed materials on the PCB problem in the Michalovce District and also on the health and environmental hazards of PCBs.

On July 2002, Greenpeace Slovakia organized a protest against continued pollution from the Chemko site by posting signs and by drawing on the road in the town of Strazske where the road crosses the PCB-contaminated canal. Public meetings and media hearing were organized during the entire 2002.

On January 15 to 17, 2003, an International Workshop on Non-Combustion Technologies for Destruction of POPs was held in Prague, Czech Republic, organized by the NGO Arnika Association in conjunction with the IPEN Dioxin, PCB and Waste Working Group. UNIDO supported this workshop.

The workshop drew 70 participants from 20 countries. Most participants, however, were from the Czech Republic and from Slovakia. The Project and related issues were presented and discussed in great detail. Following the workshop, a meeting of the IPEN European Working Group was convened whose participants were mainly NGOs from Central Europe. This meeting passed by consensus a resolution to (inter alia):

- Give strong support to the groups that are working on elimination and minimization of POPs and other toxic substances worldwide;
- Give our strong support to the efforts of NGOs and their Governments involved in preparation of National Implementation Plans/Enabling Activities;
- Call upon Governments around the world to ratify the Stockholm Convention as soon as possible; and
- Express our strong support for NGOs and communities working to identify and eliminate stockpiles of obsolete POPs, including stockpiles of obsolete pesticides and industrial chemicals, and encourage governments to facilitate and assist with data gathering and identification of stockpiles.

The meeting recognized that proven Non-Combustion Technologies for the destruction of obsolete POPs stockpiles already exist and are commercially available. It demanded that such technologies must be used in preference to those that form or release POPs, such as incineration.

On February 2003, NGOs – Greenpeace Slovakia, Spolocnost Priatelov Zeme and Otvoreny Kruh – sent an open letter to Minister Laszlo Miklos (Slovak Ministry of the Environment) addressing the PCB problem in Eastern Slovakia, and promoting Non-Combustion technology as the way to solve the problem of PCB stockpiles and polluted sediments. The letter emphasized the need for urgent action, and it called upon the Ministry to play an active role.

On 10th of March 2003, a media hearing was organized in the town of Kosice on the PCB problem, pointing to the potential of a good solution based on GEF support. Three state television stations, 4 radio stations and 3 newspaper reporters attended.

During the remainder of 2003, Slovakian NGOs, with assistance and encouragement from other NGOs in the region, lobbied the government and UNIDO, and even lobbied the NGO EHF, expressing their concern with the delays encountered in completing the Project Document, and urging rapid completion of this process so that Project implementation could finally start.

Annex 13a: ENVIRONMENTAL HEALTH FUND (EHF) MEMORANDUM

EHF Environmental Health Fund

February 25, 2005

To: Andrew Hudson, UNDP-GEF
Mohamed Eisa, UNIDO

From: Jack Weinberg, EHF

Regarding: The Role of EHF and the Public Interest NGO Sector in Project Execution

The memorandum that follows is with reference to the GEF-Funded Project entitled: ***Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs).***

The memorandum reviews and reflects understandings that have been agreed between the Environmental Health Fund (EHF) and the Project on the role of EHF and the Public Interest NGO Sector in Project Execution.

Sincerely Yours,

Jack Weinberg
Environmental Health Fund
Global Chemical Safety Program, Director

41 Oakview Terrace, Jamaica Plain, MA 02130
Tel 617.524.6018 Fax 617.524.7021

Memorandum

To: Mr. Andrew Hudson, UNDP-GEF
Mr. Mohamed Eisa, UNIDO

From: Mr. Jack Weinberg, EHF

Regarding: The Role of EHF and the Public Interest NGO Sector in Project Execution

This memorandum reviews and reflects understandings that have been agreed on the role of EHF and the Public Interest NGO Sector in the Execution of the GEF-Funded Project entitled: ***Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs).***

As noted in the Project Document, the NGO Environmental Health Fund (EHF) is listed as *Principle Cooperating Agency*.

Background

Annex 13 of the Project Document reflects that EHF proposed the original Project concept to UNDP and UNIDO in early 2000, and did so in close cooperation with a number of NGOs participating in the International POPs Elimination Network (IPEN). Since that time, EHF has played an important and active role in drafting and preparing the GEF-approved Project Concept Document and PDF-B Project Brief. EHF has been a member of the Project Steering Committee, and has undertaken the lead responsibility for providing information to, and soliciting inputs from public interest NGOs and representatives of civil society on the national, regional and global basis. EHF has been a member of the Project Technical Advisory Group (TAG) and recruited participation of other NGO experts in TAG activities including substantial technical inputs. Finally, EHF has contributed to the preparation of the present Project Document.

As was stated in the Project Objectives/Summary section of the PDF-B Project Brief, approved in early 2001:

> *"An important feature of this project is its recognition that, in many countries, groups within civil society often have resisted proposed POPs destruction and cleanup activities, and that this resistance has often been a significant barrier to the successful execution of such proposed activities. This project (during the PDF-B, PDF-C and Full Project) will demonstrate means to overcome this kind of barrier by giving special emphasis to procedures that facilitate the participation of civil society groups in ways that will encourage their confidence and support for the proposed destruction and cleanup activities."*

EHF, together with the other NGOs with whom we cooperate, are very thankful to the GEF, UNDP and UNIDO for enabling the important role of NGOs and civil society in this project and for recognizing that NGOs and civil society have an important constructive role in the determination of how PCBs and other POPs are to be destroyed.

NGOs in the IPEN network share the common goal of POPs elimination. This includes recognition that POPs stockpiles must be destroyed and that POPs contaminated soils and sediments must be remediated. However, we also recognize that civil society groups in many countries have often blocked efforts to establish facilities to destroy POPs stockpiles and/or to remediate POPs-contaminated soils and sediments. In virtually all cases, this has been based on sincere concerns that the proposed facility would, itself, become a part of the problem

rather than a part of the solution: that the facility would become a source of injury to community health and the local environment, and a new source of POPs releases.

NGO contribution to this Project has been motivated by a desire to find ways to address concerns about destruction technologies that have been raised by civil society organizations, and thereby, to secure civil society support for POPs stockpile destruction and remediation. After years of dialogue among NGOs and community groups from many countries, criteria and a methodology were agreed for the selection and deployment of POPs destruction technologies. The twin aims of this agreed approach are to successfully win civil society support for POPs destruction while, at the same time, removing barriers to the deployment of viable technologies that will successfully destroy POPs stockpiles though means that are cost-effective and also environmentally and occupationally safe and sound. This approach was reflected in criteria statements contained in the Project PDF-B Brief, and in the outputs of the Project TAG.

EHF, as a Principle Cooperating Agency, has represented global NGO interests and concerns during Project development and as a member of the Project Steering Committee. EHF has agreed to serve as a clearinghouse and coordinating mechanism for involvement of the NGO community both in Project activities in Slovakia, and also in the full range of other activities to be undertaken in the broader global Program elements described in the Project Document. In this role, EHF has a responsibility to assure that the criteria described above – as they are reflected in the PDF-B Project Brief, the outputs of the project TAG and in the Project Document – are fully realized in actual project implementation.

Project Delays and Their Consequences

Project preparations took much longer than anticipated. Informal discussions about the Project idea started in 1999 and earlier; actual Project preparations began in early 2000; and the UNDP PDF-B Project Document was approved in February 2001. However, the Project Document for the Global Program and its Slovakia phase will receive approval by the GEF and UNDP CEOs no earlier than the first quarter of 2005.

EHF devoted approximately 35% full-time equivalent professional staff time to Project Preparation activities for three years – from January 2000 through the end of 2003. EHF received some mission travel and DSA reimbursement from UNIDO, but EHF professional staff time and considerable mission travel expenses were in-kind contributions. Several other NGO experts also provided substantial in-kind contributions.

By the start of 2004, however, Project preparation activities slowed. For this and other reasons, participation by EHF and other NGOs in Project preparatory activities became greatly diminished. Now, with activation of the Project, NGO involvement needs to be fully re-established.

The delays have also meant that the state of available technologies have likely evolved since the first two Project TAG meetings in 2001 and 2003. Technologies reviewed at that time may have, since then, addressed some of the technical concerns raised at those meetings. At least one vendor company that had been reviewed very favourably at the time of those meetings now appears to have decided to leave the field and to no longer produce and sell destruction technology systems. In addition, possibly one or two technologies deemed not to be commercially available at the time of the first TAG meeting may have since emerged as is suggested in a report from the GEF Science and Technology Advisory Panel (STAP).

Technology Selection

EHF and other NGOs with whom we consult are most concerned about issues of technology selection. Since the start, we have always viewed this as a barriers reduction demonstration project in which technology selection would be criteria driven.

Activity 2.1 calls for tender and purchase of the capital equipment though a transparent two-step international tendering process with the participation of the TAG with respect to technical issues. Annex 4 states that the TAG will assume the responsibility of assessing whether or not a particular proposal meets established project criteria. Annex 4, in its section on *Special Considerations* restates two criteria for project selection that correspond to criteria adopted by public interest NGOs, and those we want to insure will be satisfied, in practice, by the selected technology. Annex 4 further states:

> "Every vendor preparing an offer for equipment supply and services to this project shall submit verified data, based on commercial operation of the same or essentially similar technology that includes characterization and analysis of process residues, including all streams of solid, liquid and gaseous residues."

EHF understands that public interest NGOs will be represented on the TAG to be convened for technology selection, and we expect the relative weight of NGOs participating in future TAG activities will be similar to that accorded NGOs at the first two TAG meetings. EHF additionally understands that Project funds are allocated to enable public interest NGOs to secure expert assistance for evaluating technology proposals.

It is also recognized, based on previous experience, that some potential vendors may not submit a full set of the requested verified data and information, as called for in the Project's technology TOR, sufficient to allow the TAG to make an informed decision on the likelihood the technology can be expected to satisfy Project criteria under everyday operating conditions. If this occurs during the technology selection phase of the bidding process, the TAG will need to be able to request from UNIDO Contract and Purchase Services that it require the vendor to provide the missing information within a given time frame. The TAG will also need the authority to reject a vendor if TAG members conclude that the data and information provided are not reliable or are not sufficient. In the end, the TAG members should agree by consensus, based on their expert judgments, on a list of bids that are technically satisfactory to forward to UNIDO Contract and Purchase Services. This list of bids should correspond to technologies, which, if properly operated, can and will consistently satisfy all Project criteria over the life of the Project and beyond.

Other Considerations

The Project Document establishes the Slovakia Project as an element of a larger global program, as was envisioned in the original PDF-B Brief. It is understood that EHF, as Principle Cooperating Agency in the program, will participate with UNDP and UNIDO in the selection process for the Program Coordinator.

Finally, it is understood that both UNIDO's Project Manager and the selected Program Coordinator will develop and maintain fully cooperative relationships with EHF over the full time period during which Project and Program activities are ongoing. Based on these relationships, EHF will be able to act as the representative of a broad, global NGO community, to assure full transparency in the development of further project activities and to provide opportunities for full collaboration and input from the NGO community, as appropriate.

Annex 14: EKOSLUZBY COMPANY PROFILE

Ekologické služby, s.r.o.

Profile of Ekologicke sluzby, s.r.o. company

History of company

Ekologicke sluzby, s.r.o. company – 100 % subsidiary of Chemko, a.s. Strazske – is operator of complex of sewage treatment plant (STP) and hazardous waste dumpsite "Plane". STP complex is located in area of Chemko, a.s. Strazske Company. Waste dumpsite is situated at the west periphery of Strazske town in the direction to the Puste Cemerne municipality.

Ekologicke sluzby, s.r.o. Company was registered at Trade Register on March 28th, 2001. Operation has begun on April 1st, 2001. Fusion of Ekologicke sluzby, s.r.o and Skladky Plane, s.r.o. companies to the one Ekologicke sluzby, s.r.o. Company was approved by decision of general assembly on July 7th, 2002. Since January 1st, 2003, Ekologicke sluzby, s.r.o. became an operator of Horka - Plane solid waste dumpsite.

Company management

100 % daughter company of Chemko Strazske a.s.
Statutory representatives: Ing. Milan Beres
Ing. Eugen Koval

Services:

- hazardous and non-hazardous waste management;
- collection, stockpile, transport, treatment and disposal of wastes including waste site management, collection, transport, sorting of waste as a source of secondary material and energy, mechanical, chemical and biological modification and treatment of sewage;
- operation and maintance of mechanical-chemical-biological STP including sludge management, waste water reservoirs, accident accumulative tank, sewer systems, pumping stations of waste water, tailraces and small watercourses;
- providing of physical-chemical and microbiological analysis in area of water and waste treatment;
- procurement of trade, services, manufacture, transport, purchase, sale and rental of realty and consulting in subject of enterprise.

Environmental management

Main guarantee of quality of offered services by company is well-established and certificated system of environmental management in accordance with ISO 14001. Ekologicke sluzby, s.r.o. Company was certificated in September of 2002 independently with validity of certificate till October of 2005. Certificate was issued by registered office SGS International Certification Services E.E.S.V.

Offered services

Services offered by Ekologicke sluzby, s.r.o. in area of treatment of waste and effluent:

1. waste disposal and treatment of sewage
   - waste dumps

Empty capacity of dump in the meaning of project of recultivation was 777 708 m^3 (December 31st, 2001), approximately 1,049,905 tonnes. Storage area of dump is 94,289 m^2. The area is divided into two containers. Storage area of first one is 48,485 m^2 and area of second one is 45,804 m^2.

Present status of waste disposal dumping in period of years 2002-2004 is described in table below:

Waste category (tonnes)	**Reality – apart from Chemko, a.s.**		
	2004	**2003**	**2002**
Other	49 321,82	12 234,20	223,205
Municipal	9 178,59	2 146,85	1 652,670
Hazardous	9 318,52	22 498,54	569,975
TOTAL	67 758,13	36 879,59	2 445,85
Waste category (tonnes)	**Reality – group Chemko, a.s.**		
	2004	**2003**	**2002**
Other	1 500,40	854,96	227,77
Hazardous	1 960,04	1 618,96	1 560,24
TOTAL	3 521,25	2 473,92	1 788,01

- purifying of waste waters and treatment of liquid hazardous wastes

Total efficiency of treatment at the STP in basic indicators of polluted wastewaters in year 2004 compared with years 2003 and 2002:

Indicator	**2002**	**2003**	**2004**
	%	**%**	**%**
BSK_5	99,69	99,65	99,64
$CHSK_{cr}$	95,16	94,60	93,85
Fd_c	78,36	86,36	84,77
Fd_v	99,63	99,63	99,27
$NH4^+$	56,47	94,16	94,35
NO_3^-	97,71	84,52	82,77
NO_2^-	59,48	86,88	96,99

2. transport of wastes (preserved in subcontract) – road, railway (just solid wastes)
3. additional services

- processing of environmental documentation and waste management (legislative department)
- sampling and analysis

Annex 14a AGREEMENT BETWEEN EKOSLUZBY AND CHEMKO CONCERNING PRICING FOR PCB WASTES DESTRUCTION

Agreement which Aims to Clarify Pricing for Waste Destruction between

Ekologické služby, s. r. o.
člen skupiny Chemko, a. s. Strážske
Priemyselná 720
072 22 Strážske

and

Chemko, a. s. Strážske
Priemyselná 720
072 22 Strážske

Terms of Agreement ("Agreement")

1. Ekologické služby, s. r. o. and Chemko, a. s. Strážske (the "Parties") hereby agree to work together to destroy PCB contaminated waste, as more specifically defined in GEF/UNDP/UNIDO Project : "Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs)" (the "Project"). This Agreement sets out the terms on which Ekologické služby, s. r. o. and Chemko, a. s. Strážske will work together.

2. The Parties will each bear all of their own costs and expenses inworking on the Project.

3. Ekologické služby, s. r. o. commit themselves to secure Chemko, a. s. Strážske the rigid price of 1,921 USD per 1 tonne of waste contaminated by PCB to be disposed in the destruction unit operated by Ekologické služby, s. r. o.

4. The price that is an objective of this Agreement was calculated based on actual prices on the Slovak market and circumstances of waste storage on the disposal site. The up-to-date market price is lopped off transport expenses.

5. The Parties stipulate right for adjustment of objective price with regard to change of legislation and tax conditions, inflantion influence, change of prices of commodities and energies and labour costs development.

ACCEPTED AND AGREED TO :

[COMPANY NAME]

By: **Ekologické služby, s. r. o.**

Ing. Eugen Kovaľ
Legal Representative of the Company

Ing. Milan Béreš
Legal Representative of the Company

Date: 17. 9. 2005

By: **Chemko, a. s. Strážske**

Ing. Dušan Hordoš, PhD.
Chairman of the Board

Ing. Andrej Ješka
Member of the Board

Date: 17. 9. 2005

Annex 15: DOCUMENTS ON FINANCIAL AND TECHNICAL ARRANGEMENTS

MINISTERSTVO ŽIVOTNÉHO PROSTREDIA
SLOVENSKEJ REPUBLIKY

László MIKLÓS
minister

Bratislava 05.10.2005
Ref: 1101/2005-min.

Dear Mr. Eisa,

Enclosed please find the documents related to the implementation of the project "Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs)".

These documents were developed and agreed by the Slovak Ministry of Environment in relation to the above mentioned Project Document.

List of attachments:

1. Financial provisions for the co-financing budget of the Slovak Ministry of Environment in relation to the Non-Combustion Project
2. Letter of understanding concerning ownership of equipment
3. Sediment and Soil Remediation of Zemplin Region addressing PCB contamination
4. Terms of Reference: Services delivery: packaging, collection, transport and interim storage of the waste containing PCB

We do hope that the Project Document will be approved in the near future so that the Project will enable Slovak Government to start to address the top priority problem related to PCBs using demonstration of the non- combustion technology.

With the best regards

UNIDO
Vienna
Mr. Mohamed Eisa
Head of POPs Unit

Annex 15a: FINANCIAL PROVISIONS FOR THE SLOVAK MINISTRY OF ENVIRONMENT CO-FINANCING BUDGET

The financial participation of the Ministry of Environment is in details prescribed in the table and chart below.

The Ministry of Environment of the Slovak Republic has the overall responsibility for environmental management including regulatory, monitoring, permitting and licensing functions on all matters related to protection and conservation of the environment. The Ministry also serves as the GEF operational focal point as well as the POPs focal point. As such, the Ministry will have the lead responsibilities in coordinating all other Slovakian institutions participating in the project. The Ministry will contribute US$ 2.0 million in-kind as co-financing to the project. This co-finance includes, among other things, in-kind contribution for project support and coordination, environmental impact assessment (EIA), certification of the operation of the destruction unit, monitoring and evaluation, and development of the public/private sector partnership.

Other major public sector stakeholders in the project are represented in the Public Consortium which consist of the Košice Self-governing Region, the town of Michalovce, the town of Strážske, and the Slovakian Hydroeconomic enterprise. The institutions have agreed to form a public sector consortium in order to coordinate their activities in the project. The Public Consortium will contribute US$ 1.0 million in-kind as co-financing to the project.

Upon deployment of the non-combustion technology equipment, the national operating company Ekoslužby s.r.o., will operate the destruction facility and will provide its operating expenses co-finance, including setting-up and civil engineering, of up to US$ 2.2 million.

Chemko Strážske will contribute for final destruction of 1000 tones of PCB wastes residues from the formal production of up to US$ 1.921 million.

PCB waste service providers will be responsible for continuous and adequate supply of PCB to the operations through collection, transport and storage of PCB waste and PCB containing equipment from all over Slovakia and will, for purposes of these activities, be providing US$ 2.0 million co-finance. This co-finance contribution is in this stage guaranteed by the Slovak Government.

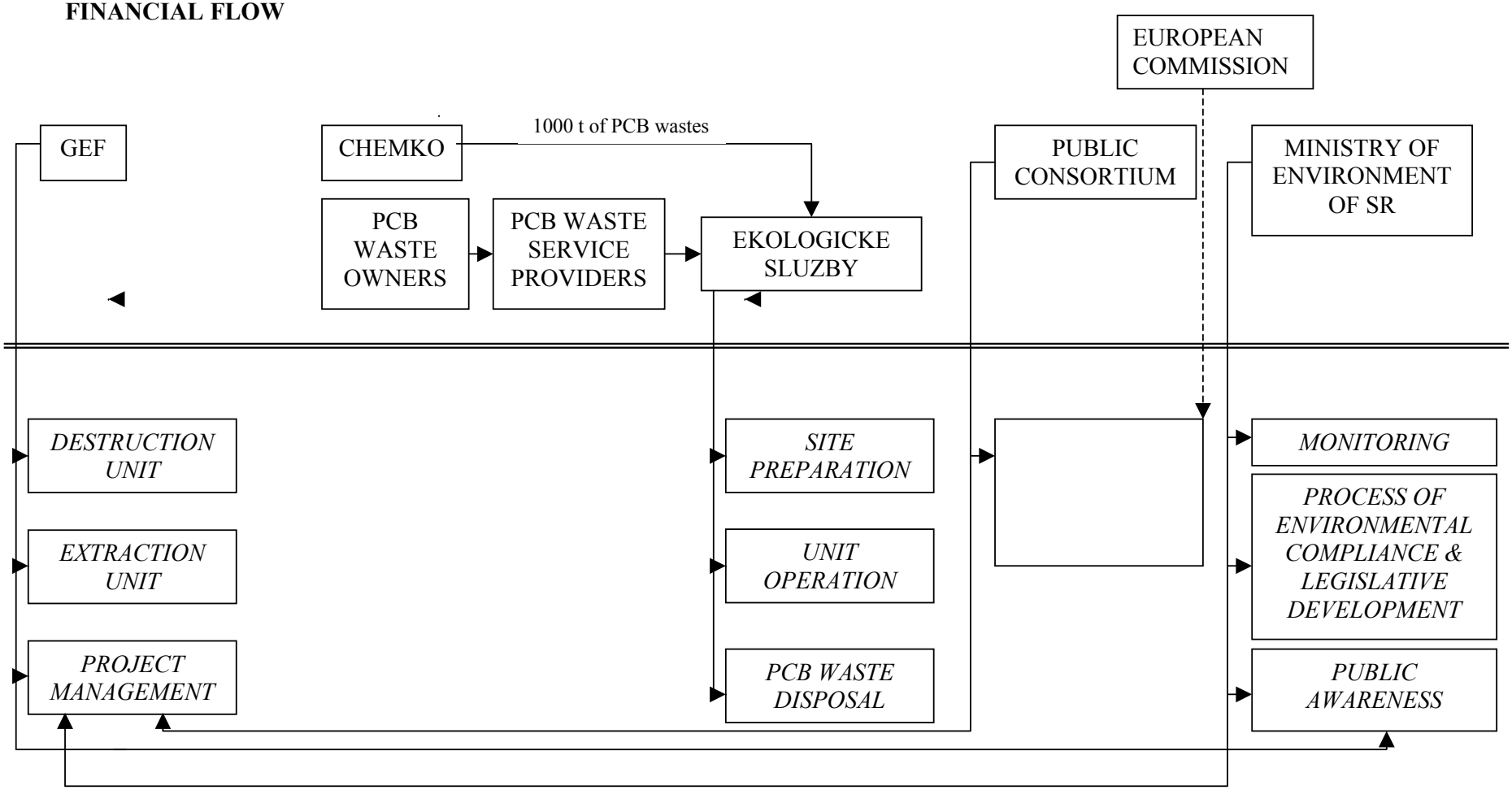
The owners of the PCB wastes and PCB containing equipment will ultimately pay the services related to collection, transport and disposal of PCB wastes provided by certified companies (PCB waste service providers).

Budget (Co-financing): Government of Slovakia (Slovak Ministry of Environment)

Cost	Title	Activity	Activity Financed	Bidding Process
80,000	Legal and technical requirements	Documents, studies, analysis, project meetings	Regular Ministry budget	Restrictive binding
25,000	Development of monitoring protocols and project evaluation framework	Elaboration of plans and schedules required for project realization in the relevant area	Regular Ministry budget	Arrangements between MoE and relevant agencies

200,000	Environmental compliance monitoring and evaluation (Standard EIA Practice) during destruction (Project implementation phase)	Participation at EIA process and public participation Participation during installation, start-up and operation of destruction unit	Regular Ministry budget Regular budgets of SEI and SEA and SHMI	Not relevant Arrangements between MoE and relevant agencies
35,000	Assure continuing civil society involvement in project activities in Slovakia including presence in monitoring and evaluation	Activities of the Department for the Public Relations	Regular Ministry budget	Arrangements between MoE and relevant agencies
25,000	Provide technical and other information and assistance to public and private sector entities	Local MoE consultant		
500,000	Analysis of contamination levels in canal sediment, river and lake	Complex activities monitoring of contaminated sediments and soils	Projects budget of MoE and Regular Ministry budget	Open bidding for sampling groups and analytical laboratories, experts
550,000	Site supervision and compliance	Control of site and activities running on the site	Regular Ministry budgets of SEI, SEA, SHMI, WRI and different project sources (SR, EU, other)	Arrangements between MoE and relevant agencies, open bidding
400,000	State programmes for maintenance and monitoring of inventories, information gathering, waste management and coordination by the state authorities	Regular activities in the area of handling with PCB waste of public servants of MoE, SEI, SEA and SHMI	Regular Ministry budget	Arrangements between MoE and relevant agencies
185,000	Miscellaneous	Relevant activities	Regular Ministry budget	MoE

FINANCIAL FLOW



Annex 15b: LETTER OF UNDERSTANDING CONCERNING OWNERSHIP OF EQUIPMENT

LETTER OF UNDERSTANDING

GEF/UNDP/UNIDO Project: "Global Programme to Demonstrate the Viability
and Removal of Barriers that Impede Adoption
and Successful Implementation of Available, Non-Combustion Technologies
for Destroying Persistent Organic Pollutants (POPs)

OWNERSHIP OF EQUIPMENT

1. Background

The Project (Slovakia Project), part of the Global Programme, will introduce and apply available non-combustion technologies to destroy significant obsolete PCBs wastes in Slovakia, and will help remove barriers to the further adoption and effective implementation of available non-combustion technologies and meet the Stockholm Convention requirement to ensure the use of Best Available Techniques (BAT) and Best Environmental Practices (BEP). The Project will make available all technical, economic and financial parameters of the selected technology in a comparative, open and transparent way that would facilitate and provide further incentive to the global diffusion of innovative alternative non-combustion technologies.

The GEF Slovakia Project will last six years (72 months). The first twenty-four months will be committed to parallel activities of a tendering process, obtaining necessary operating permits, including conducting necessary environmental impact analyses; designing, constructing and testing of the non-combustion technology to be deployed; and generally planning and organizing, among other things, such activities as a comprehensive public participation and involvement plan, and a comprehensive, participatory monitoring and evaluation plan.

The next eighteen months of Project time would involve the actual destruction of 1,000 tonnes of PCB contaminated product, targeted stockpile of waste residues from the formal PCB production in Chemko Strázske. Also included during this eighteen month operational phase would be implementation of the broadly based public participation and involvement plan, and the initiation of the rigorous monitoring and evaluation program.

Following 30 month would involve destruction of 1,500 PCB waste from the state sector and other PCB waste and contaminated equipment owners in Slovakia and activities related to the destruction of PCB concentrate from decontamination activities of highly contaminated sediments and soil.

The last six months of project time, overlapping with operations, would be committed to the comprehensive assessment of overall project results, including lessons learned and the definition of concrete mechanisms for successful replication at regional and global levels, and the technology transfer process.

2. Statement of Technology Units Deployment

In terms of the project 2 technology units will be deployed:

A. PCB Destruction Unit
B. Extraction Unit for soil and sediment matrices

3. Technical and Legal Conditions

3.1. Technology units will be purchased using GEF grant and ownership will be transferred to the Slovak Government, consistent with UNDP and UNIDO rules and regulations after successful installation.

3.2. Once the ownership is moved, the Slovak Government is aware of all related responsibilities related to the hardware and equipment ownership.

3.3. Destruction unit - the issue of the ownership of the plant after the demonstration phase has to be agreed upon. In case the operating entity would be owner, the plant would operate at a commercial scale, a royalty fee should be agreed upon and paid by the operating entity. Final solution will be prepared during the first year of the project and will be matter of approval by the Slovak Government based on recommendation prepared by the Project Steering Committee.

3.4. Extraction unit - ownership could be shifted to the Slovak Hydro-economic Enterprise (State owned company), or ownership could be shifted on depreciated cost to other state owned or private entity. Final solution will be prepared during the first year of the project and will be matter of approval by the Slovak Government based on recommendation prepared by the Project Steering Committee.

4. Technology Units Ownership Transfer

The ownership of the technology units will be transferred to the Government of the Slovak Republic, consistent with UNDP and UNIDO rules and regulations during the project realization after successful installation, when the units will be in full operation stage. The present practice is to transfer it first to the Government signatory to the Project Document, which will then be responsible for contractual arrangements with an operating entity for providing services under agreed conditions. The operating entity would continue operations beyond the project life and would continue to destroy PCB wastes in Slovakia. It is expected – and Government of Slovakia is committed to ensure – that the non-combustion destruction unit will be utilized to destroy the remainder of the inventoried PCB wastes and PCB-containing equipment, as well as cleaning up the soil and sediment that show the highest PCB concentrations in close vicinity of the project site (Lake Zemplínska Šírava). As an additional benefit, the public-private partnership developed through the project will be strengthened and will significantly contribute to the revitalization of the region's economy by mitigating the very serious environmental and public health problem in eastern Slovakia, problems that have significantly reduced tourist revenues in the region that in the past were generated by the lake as an international recreational area.

5. Proposal for technology units operation arrangements

The selected operation entity will be, on the base of specific contract, responsible to:

- Operate the unit based on technical and environmental standards, technology specific operational rules;
- Day-care and Maintain the unit;
- Cover all related expenses, which are necessary for proper handling and operation of the units including costs for insurance license and other legally required fees and taxes.

The operation entity will use the technology unit free of charge, but covering license fee (if applied) and all other related costs for actual waste destruction (PCB waste destruction unit) or sediments and soil extraction (sediment and soil extraction unit). Specific costs for waste destruction and other related costs would be covered by PCB waste owners on the base of providing services by operation entity.

6. Parties

The Parties of this Letter of Understanding are:

1. Ministry of the Environment of the Slovak Republic
2. UNIDO
3. Operation Entity, Ekosluzby s.r.o.

Annex 15c: SEDIMENT AND SOIL REMEDIATION OF ZEMPLIN REGIONA ADDRESSING PCB CONTAMINATION

Sediment and Soil Remediation of Zemplin Region addressing PCB contamination

Contamination of Zemplin Region by polychlorinated biphenyls represents serious threat to the environment and local population. The total PCBs exposure for population of eastern Slovakia is expected to be higher then acceptable daily dose defined by the World Health Organization and is significantly higher in comparison to average Slovak population. For this reason improvement of the situation is of interest for many state bodies and local communities.

Self-governing Region Kosice Authority has been occupying themselves with PCB contamination problem of the Zemplin Region for several years. It has initiated involvement of regional and local municipalities in the project and took a leading role in the consortium of Public Sector in the project. All the parties have deep interest in solving the problem of contaminated soil and sediments in the Zemplin Region. Especially Strazske town where the former PCB production site, landfill Plane (PCB wastes) and high-contaminated open waste canal are located, Michalovce town with its recreational resort Zemplinska Sirava Lake and intention to improve all the conditions for tourist trade increasing do.

Self-governing Region Kosice Council adopted on its 8th session in October 15, 2002 Plan of Economic and Social Development of Kosice Region and on its session in October 25, 2004 in Kosice approved co-financing for the project supported from European Commission Funds – Master Plan on Revitalization and Development of Zemplin Region.

Plan of Economic and Social Development of Kosice Region – in this document there have been global and specific development objectives of the region specified. Under the Global objective 1 – Environmental burdens decreasing, Specific objective 3 – Conservation of specially protected nature areas, remediation of locations with violated environment, environmental revitalization.

In the frame of this Specific objective the Self-governing Region Kosice Authority focused on elimination of old environmental burdens: "The most significant problem represent contamination of sediments in **Zemplinska Sírava Lake** and its surroundings by PCBs … The first unavoidable step is preparation of mid-term remediation plan for Zemplinska Sírava Lake and its surroundings with help of European Commission Funds. The main objective of this project is solution of environmental compartments contamination by PCB, bad water quality inductive of eutrofization, insufficient recreational infrastructure and tourist trade stagnation. The project results should be a solution proposal on complex area revitalization and its technical – economic interpretation....."

Master Plan on Revitalization and Development of Zemplin Region - „The objective of the Master Plan is strategy determination to improve environmental quality and to update tourist trade infrastructure. A special attention should be paid to definition of measures on improving water quality and on PCB contamination settlement. The Master Plan will serve as a basis for investment projects preparation in the area. The overall goal of revitalization is, beside the environmental revitalization, support of local and foreign tourists comeback to the Sirava Lake resort, development of SMEs and at the same time decreasing of local unemployment."

Committee on Environment and Nature Protection of the National Council of the Slovak Republic based on its Resolution No. 22 from February 12, 2003 discussed the „Status and problems of environment in the East Slovakian Region" and decided on the resolution from May 19, 2003 where Committee:

A. Requests Minister of Environment to submit to the Committee on Environment and Nature Protection of the National Council of the Slovak Republic a conception of PCB elimination in the Slovak Republic;

B. Recommends to Minister of Environment in cooperation with Chemko, a.s., Strazske to elaborate a solution of state financial support of elimination of stored PCBs in Zemplin Region and a solution concept on PCB contaminated sediments in waste and saturation canals in the catchments area of the Laborec River.

Ministry of Environment of the Slovak Republic, its Geological Department has prepared a project "Determination of Old Environmental Burden in the Waste Canal connecting Chemko, a.s. Strazske with the River Laborec and Proposal to eliminate this burden" and this project is designed to:

- Log on the National Implementation Plan (NIP), a result document of the project „Initial assistance to the Slovak Republic to meet its obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs)", (MoE SR). Based on obligations of the Stockholm Convention it is necessary the all investigation and remediation works related to POPs to be in compliance with Slovak NIP on POPs.
- Be in compliance with Annex „Sites polluted by POPs of Stockholm Convention....." point 2.2 „How to prepare contaminated site investigation" and meet its objective: „Start process of size determination of sites that might threaten environment (soil, underground water sources) and human health". Meeting this precondition continuity with previous accomplished works and financial efficiency will be reached.
- Waste canal is – according to NIP – one of the POP priorities in the country and so the geological project comes in compliance with NIP.

Annex 15d: TERMS OF REFERNCE FOR SERVICES DELIVERY INCLUDING PACKING, COLLECTION, TRANSPORT AND INTERIM STORAGE OF THE WASTES CONTAINING PCBS

TERMS OF REFERENCE

GEF/UNDP/UNIDO Project: „Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs)“

SERVICES DELIVERY: PACKAGING, COLLECTION, TRANSPORT AND INTERIM STORAGE OF THE WASTE CONTAMINATED BY PCB

Background

Parties to the Basel and Stockholm Convention should examine national controls, standards and procedures to ensure that they are in line with of the respective conventions and their obligations under them, including those that pertain to ESM of wastes consisting of, containing or contaminated with PCBs. Handling, collection, packaging, labelling, transportation and storage are critically important steps as the risk of a spill, leak or fire (for example in preparation for storage or disposal) is equal to or greater than that during the normal operation of the equipment.

The main concerns when handling wastes consisting of, containing or contaminated with PCBs, PCTs or PBBs are human exposure, accidental release to the environment and contamination of other waste streams with PCBs, PCTs or PBBs. Such wastes should be handled separately from other waste types in order to prevent contamination of these other waste streams.

Parties

The Terms of Reference represent frame for an Agreement between POPs wastes disposal company under the Project (Ekosluzby s.r.o.) and service providers responsible for collection of PCB wastes from PCB owners, safe interim storage a transport to the site of destruction facility. The Agreement is in principle opened for all of registered and licensed companies in the Slovak market as well as individual PCB owners.

Statement of Work

Service delivery in terms of provision of environmentally sound handling (collection, transport and interim storage of PCB waste) prior its final disposal in the frame of the project “Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (POPs).

Scope of Work

Initiation Date:
Completion Date:

Tasks

- Suitably package, collect and transport, according to international and national rules and standards;

- Store the waste for a minimum reasonable period under conditions, which will prevent its release to the environment until appropriate recovery, treatment or disposal facilities are provided.

Technical and Legal Requirements

- Company/-ies handling wastes (collection, interim storage, transport) within the country has to be certified based on national legal requirements;
- Company/-ies should dispose of sufficient financial, technical and personnel capacity;
- Personnel should be experienced, technically competent qualified and trained in the correct methods of handling hazardous wastes;
- Company/-ies should perform environmentally sound and economically efficient operation pursuant to written standards or procedures.

Financial preconditions

The disposal facility (Ekosluzby s.r.o.) will make agreement with each individual company which should provide their services – deliver PCB wastes for final disposal. In compliance with up-to-date market prices covering costs for final destruction of the wastes, the disposal facility will charge related costs based on wastes specification and amount.

List of companies certified for handling and disposing of PCB containing equipment and wastes in the Slovak Republic

1. **ARGUSS s.r.o. nakladanie s odpadmi,**
   Blumentálska 19, 816 13 Bratislava
   Kontakt: p. Róbert Vajda
   mobil: 0905 455 301

2. **DETOX s.r.o.**
   Zvolenská cesta č. 139,
   974 01 Banská Bystrica
   Kontakt: p. Mgr. Čellár
   tel.: 048 / 416 16 44

3. **ENZO s.r.o.**
   Trenčianska cesta č. 764/42
   018 51 Nová Dubnica
   Kontakt: p. Oľga Zajacová
   tel. 042 / 43 111 69

4. **Eko-Salmo s.r.o.**
   Závodná 8, 821 06 Bratislava
   www.eko-salmo.sk

5. **FECUPRAL s.r.o.**
   Ľ. Štúra 17, Veľký Šariš
   tel.: 051 /772 3594
   fax/zaznamnik: 051/759 5282
   www.fecupral.sk

6. **V.O.D.S., a.s. Košice**
   Podnikateľská 2
   040 17 Košice - Barca
   Slovensko
   telefón / fax: 055 / 678 0310, 678 2889, 678 0269
   e-mail: sekretariat@vods.sk
   non-stop infolinka: 055 / 7894 202, 0907 982 645